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Environmental Assessment

Montana Army National Guard Helicopter Conversion Helena Regional Airport

February 1995

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FINDING OF NO SIGNIFICANT IMPACT
Montana Army National Guard Helicopter Conversion
Helena, Montana

INTRODUCTION

This Finding of No Significant Impact (FNSI) documents the conclusions of the Environmental Assessment (EA) for the proposed Montana Army National Guard (MT ARNG) helicopter conversion and construction of an Army Aviation Support Facility (AASF) at Helena, Montana. The EA and this FNSI have been prepared in accordance with the National Environmental Policy Act of 1969, Council on Environmental Quality regulation, and Army Regulation 200-2.

THE PROPOSED ACTION

The MT ARNG, under the direction of the Federal National Guard Bureau, is examining the composition and mission of its existing helicopter fleet. The MT ARNG's helicopter fleet is located at the Helena Regional Airport in Helena. Currently, the MT ARNG has 18 AH-1(Cobra) helicopters, 3 UH-1H (Huey) helicopters, 6 UH-1HA (Huey) helicopters, and 18 OH-58 (Kiowa) helicopters. The MT ARNG is proposing to replace the 18 Cobra helicopters with 13 Huey helicopters and 8 UH-60 (Black Hawk) helicopters. The 18 Kiowas will continue to be used for training purposes. The proposed conversion is expected to occur over a period of two and one-half years.

An Army Aviation Support Facility (AASF) to house the Hueys and Black Hawks is proposed for construction at the Helena Regional Airport. The proposed new 123,929 square foot AASF will provide a facility for operation of the assigned aircraft. About 857,000 square feet of ground will be disturbed for rigid and flexible pavements to accommodate exterior site developments such as aircraft and vehicle parking, maintenance hanger/cold storage hanger access aprons, taxilanes/hoverlanes and shoulders, a rearm and refuel pad, connecting taxiways, an aircraft wash platform, and a hard surfaced secure storage area.

Two alternatives to the proposed action were considered as part of this EA. The first alternative was to field AH-64 (Apache) helicopters (the Apache fielding alternative), and the second alternative was not taking any action (the no action alternative).

ANTICIPATED ENVIRONMENTAL EFFECTS

Based on discussions with MT ARNG personnel, Federal and State agencies, local authorities, and comparisons with similar Army activities, several areas of potential concern associated with the proposed helicopter conversion were identified. The findings of the EA are summarized below.

No significant environmental impacts will result from the proposed action or present any reasonably foreseeable cumulative actions at MT ARNG facilities at Helena, Montana. Impacts to biological and cultural resources, hazardous material and waste management, the noise environment, and socioeconomic resources will be insignificant. Impacts to geological, air, and water resources will be insignificant with mitigation. Implementing the Apache fielding alternative will require mitigation to reduce noise impacts to an insignificant level.

Geological Resources. Adverse, but insignificant, impacts to geological resources will result from construction of the proposed AASF. These impacts will be caused by site preparation, including the removal of vegetation, and the excavation and stockpiling of topsoil and organic matter. Indirect impacts from wind and water erosion will also occur.

Impacts from operations, with mitigation, will be insignificant. An unlined detention basin will collect runoff from most of the site, which would include any contaminants resulting from uncontrolled industrial operations. Because of high soil permeability, the contaminants could impact the underlying geology and groundwater. Prevention could be achieved by closely monitoring operations and using spill response capabilities to clean spills. Lining the basin would prevent contaminants from reaching the soils or groundwater. The storm water collection system will meet the requirements in the Helena Regional Airport storm water discharge program. Soil erosion control measures, such as silt traps, mulch, sediment ponds, and reestablishing vegetation, are required under the Montana Pollutant Discharge Elimination System regulations to prevent excessive erosion and siltation of nearby creeks and the irrigation canal. Soil stockpiles should be covered to prevent wind erosion.

Air Resources. Direct air quality impacts will occur as a result of construction (e.g., filling, grading, paving, and traffic) and operational activities (e.g., refueling, facility operations, and aircraft). Construction-related impacts will occur intermittently for about one year, while operational impacts will be long-term. Air quality impacts during construction will be potentially significant; the calculated daily emission rates for NO_x and PM_{10} will exceed significant threshold rates. The exceeding levels can be mitigated by the contractor. Operational impacts for the proposed action or the Apache fielding alternative will be insignificant.

To reduce fugitive dust from construction, the contractor will apply approved chemical soil stabilizers to all inactive construction areas and replace ground cover in disturbed areas as

quickly as possibly. Other measures would be to enclose, cover, water twice daily, or apply approved soil binders to exposed stock piles, sand, or dirt. To minimize NO_x emissions, the contractor will use construction equipment that has catalytic converters (for gasoline powered equipment), and prevent trucks from idling longer than two minutes. All construction vehicles will have required emission control devices in place and will be properly tuned and maintained.

Noise. Noise generated during AASF construction will cause insignificant impacts to receptors. Operating Black Hawk helicopters, which generate less noise than the Cobra helicopters currently fielded, will result in an insignificant impact. Flying operations under the Apache fielding alternative, with mitigation, will cause insignificant adverse impacts.

For the Apache fielding alternative, night-time helicopter flights will, be directed at least one-half mile away from residential areas to reduce the potential for noise disturbances. Noise levels for the Apache helicopters attenuate to about 60 dBA at one-half mile straight ahead of the flight and 50 dBA one-half mile to the side of the flight. This is below significant levels.

Biological. Proposed construction activities will disturb small areas of common grassland and domestic vegetation. These activities will not lead to degradation of important habitat, or loss of aquatic resources, or risk the viability of threatened or endangered flora and fauna. Negligible changes in MT ARNG helicopter ground and flight operations and associated pollutant emissions will result in negligible impacts to biological resources.

Water Resources. No significant impacts to water resources will occur during the construction of the AASF. Although the surface water drainage will be re-routed by the construction action, following the Storm Water Erosion Control Plan will prevent any degradation of surface water resources. Groundwater will not be significantly impacted by construction of the new facility. Impacts to groundwater from operation, with the mitigation described in geological resources, will be insignificant. If the Storm Water Erosion Control Plan is followed during construction, impacts to surface water resources will be insignificant.

Cultural. A potential impact to cultural resources exists from construction of the AASF. The Cultural Resources Inventory identified the possibility for a buried site to exist on the property, and has recommended monitoring of the site during ground disturbing activities by a qualified archaeologist. Monitoring of the site during ground disturbing activities will reduce the potential for impacts to cultural resources.

Hazardous Materials and Hazardous Waste Management. The proposed action will have an insignificant impact on hazardous materials and waste management. The Apache fielding alternative will have a negligible impact on hazardous materials and waste management.

Socioeconomics. As a result of the proposed action, impacts to socioeconomic resources in the Lewis and Clark County are expected to be negligible, except for a beneficial impact to the local economy from the construction expenditures. Transportation impacts will be insignificant. Impacts from the Apache fielding alternative will be similar to those occurring under the proposed action.

FINDING OF NO SIGNIFICANT IMPACT (FNSI)

In accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act of 1969, as amended, and Army Regulation 200-2, an assessment of the identified environmental effects has been prepared for the helicopter conversion and AASF construction at Helena, Montana. The determination has been made that the action will have no significant impact on the quality of the human environment. Thus, an environmental impact statement is not warranted.

Copies of the final document are now available for public review and comment. Copies can be obtained at: the Lewis and Clark Library and the State Library. Questions and comments should be directed to: Department of Military Affairs, Environmental Division, P.O. Box 4789, 1100 North Main, Helena MT 59604-4789. For further information, contact Mr. John Wheeler at 444-0708.

19 Jan 95
Date

WILLIAM C. BILO
Brigadier General, GS
Deputy Director, Army National Guard

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ACRONYMS AND ABBREVIATIONS

AASF	Army Aviation Support Facility
AGE	Aerospace Ground Equipment
AH-64	Apache helicopter
AIRS	Aerometric Information Retrieval System
ARNG	Army National Guard
AST	Aboveground Storage Tank
ATKHB	Attack Helicopter Battalion
AVCRAD	Aviation Classification Repair Activity Depot
CCAD	Corpus Christi Army Depot
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERL	Construction Engineering Research Laboratory
CFR	Code of Federal Regulations
CO	Carbon Monoxide
dB	Decibel
DBA	Decibel on the A-weighted Scale
DHES	Department of Health and Environmental Sciences
DNL	Day Night Average Sound Level
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EIFS	Economic Impact Forecasting System
FY	Fiscal Year
HUD	Housing and Urban Development
IDARNG	Idaho Army National Guard
IICEP	Interagency Intergovernmental Coordination for Environmental Planning
ILS	Instrument Landing System
IRP	Installation Restoration Program
JP-4	Jet Petroleum
LAW	Light Anti-tank Weapon
LTA	Local Training Area
m	Meter

MAAQS	Montana Ambient Air Quality Standards
MCA	Montana Codes Annotated
MCL	Maximum Contaminant Level
mg/L	Milligrams per Liter
MPDES	Montana Pollutant Discharge Elimination System
MT ARNG	Montana Army National Guard
MTNHP	Montana Natural Heritage Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NOE	Nap of the Earth
NO_2	Nitrogen Dioxide
O_3	Ozone
ODC	Ozone Depleting Compounds
OH-58	Kiowa helicopter
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCI	Per Capital Income
PM_{10}	Particulate Matter
POL	Petroleum, Oil, and Lubricant
PSD	Prevention of Significant Deterioration
psi	Per Square Inch
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
RTV	Rational Threshold Value
SAR	Sodium-adsorption Ratio
SIP	State Implementation Plan
SEL	Sound Exposure Level
SO_2	Sulfur Dioxide
TDS	Total Dissolved Solids
TOE	Table of Equipment
tpy	Tons per Year
UH-1	Huey helicopter
UH-60	Black Hawk helicopter
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound
µg/L	Micrograms per Liter
$\mu g/m^3$	Micrograms per cubic meter

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This environmental assessment (EA), prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality Regulations, and Army Regulation 200-2, evaluates the National Guard Bureau's proposal to convert the existing Montana Army National Guard's (MT ARNG's) helicopter fleet and to construct a support facility. An alternative to field AH-64 (Apache) helicopters and a no action alternative are also evaluated. The EA addresses potential impacts to the biological, physical, and human environs of the project area from the proposed construction and proposed helicopter-related activities.

The Proposed Action

The National Guard Bureau is proposing to convert the MT ARNG's existing helicopter fleet and reclassify the battalion's mission from performing attack functions to providing utility, mobility, and support during combat. Currently, the MT ARNG has 18 AH-1 (Cobra) helicopters, 3 UH-1H (Huey) helicopters, 6 UH-1HA (Huey) helicopters, and 18 OH-58 (Kiowa) helicopters. The proposed action, also known as the preferred alternative, is to replace its 18 Cobra helicopters with 22 UH-1H Huey helicopters and 8 UH-60 (Black Hawk) helicopters. The 18 Kiowas would continue to be used for training purposes. The proposed conversion would be expected to occur over a period of two and one-half years. The 18 Kiowas will be removed from service by 1999. Flight time of the helicopter fleet would remain the same, but the number of night operations would decrease somewhat.

The MT ARNG's helicopter fleet is located at the Helena Regional Airport in Helena. An Army Aviation Support Facility to house the Hueys and Black Hawks is proposed for construction at the Helena Regional Airport. This 123,929 square foot AASF would provide a facility for controlling the utilization and operation of the assigned aircraft. Approximately 857,000 square feet of ground would be disturbed for rigid and flexible pavements to accommodate exterior site developments such as aircraft, privately owned vehicle, and government vehicle parking, as well as a maintenance hanger/cold storage hanger access aprons, taxilanes/hoverlanes and shoulders, a rearm and refuel pad, connecting taxiways, aircraft wash platform, hardsurfaced secure storage area, and an above-ground storage tank pad.

Apache Fielding Alternative

An alternative to the proposed action is to field 18 AH-64 (Apache) helicopters. In addition, three Blackhawk helicopters would be deployed. The 18 Kiowa helicopters would remain in service until 1999. Under this alternative, the mission of the battalion would remain unchanged. Both flight time and the number of night missions would increase over current conditions.

No Action Alternative

If the no action alternative was implemented, the helicopter fleet would not be converted (as outlined in the proposed action or Apache fielding alternative). However, normal minor upgrades of existing equipment could occur. The current AH-1S Cobras could be modified to AH-1F Cobras. The modification entails eliminating the 7.62MM Mini Gun and converting from a 40MM Practice M385 LKD to a 20MM Gun.

POTENTIAL IMPACTS

The following areas of concern have been identified during evaluation of the affected environment. For these resource areas, potential environmental consequences associated with the proposed action or Apache fielding alternative were evaluated, and possible mitigation measures, management practices and control measures were suggested.

Geological Resources The results of the analysis in this section indicate that adverse, but insignificant impacts to geological resources would result from construction of the proposed AASF. These impacts would be caused by direct physical disturbances such as site preparation, including the removal of vegetation, excavation, and stockpiling of all topsoil and organic matter. Indirect adverse, but insignificant impacts from soil disturbances leading to potential wind and water erosion and destruction of habitat used by local wildlife would also occur.

Impacts from operation would be insignificant. A detention basin would collect stormwater runoff from most of the site. The runoff could have minor amounts of oils and fuel which could drain into the detention basin. Because of moderate to moderately rapid permeability in the soils and geology, these materials would potentially impact the underlying geology. The amounts of oils or fuels on the pavement would likely be minimal because any spills of these materials would be cleaned up as directed in the existing spill response plan. Potential soil and groundwater contamination could also be prevented by installing an impermeable liner in the basin.

Soil erosion control measures, such as silt traps, mulch, sediment ponds, and reestablishing vegetation, are required under the Montana Pollutant Discharge Elimination System regulations to prevent excessive erosion and siltation of nearby creeks and the irrigation canal. Topsoil could be stockpiled separately from the subsoil to preserve the value of both resources. Soil stockpiles should be covered to prevent wind erosion.

Air Resources Direct air quality impacts would occur as a result of construction (e.g.; filling, grading, paving, traffic) and operational (e.g.; refueling, facility operation, aircraft operation) activity associated with the proposed action. Construction-related impacts would occur intermittently over approximately one year, while operational impacts would be long-term. Based on the analysis described in this section, air quality impacts during construction would

be potentially significant while operational impacts for the proposed action or the Apache fielding alternative would be insignificant. During construction, the calculated daily emission rates for NOx and PM_{10} would exceed significance threshold rates. Much of the additional emissions can be mitigated by the contractor.

To reduce fugitive dust from construction, the contractor should apply approved chemical soil stabilizers to all inactive construction areas and replace ground cover in disturbed areas as quickly as possible. Other measures would be to enclose, cover, water twice daily, or apply approved soil binders to exposed stock piles, sand, or dirt. To minimize NOx emissions, the contractor should use construction equipment that has catalytic converters (for gasoline powered equipment) and prevent trucks from idling longer than two minutes. All construction vehicles should have required emission control devices in place and should be properly tuned and maintained.

Noise Noise generated during AASF construction would cause insignificant impacts to receptors. Operating Black Hawk helicopters, which generate less noise than the Cobra helicopters currently fielded, would result in an insignificant beneficial impact. Flying operations under the Apache fielding alternative, with mitigation, would cause insignificant adverse impacts.

For the Apache fielding alternative, night-time helicopter flights should be directed at least one-half mile away from residential areas to reduce the potential for noise disturbances. Noise levels for the Apache helicopters attenuate to about 60 dBA at one half mile straight ahead of the flight and 50 dBA one-half mile to the side of the flight. This is below significant levels.

Biological The proposed construction activities would disturb small areas of common grassland and domestic vegetation. These activities would not lead to degradation of important habitat, or loss of aquatic resources, or risk the viability of threatened or endangered flora and fauna. Negligible changes in MT ARNG helicopter ground and flight operations and associated pollutant emissions would result in negligible additional impacts to biological resources.

Water Resources No significant impacts to water resources would occur during the construction of the AASF. Surface water drainage would be re-routed by the construction action; however, following the Storm Water Erosion Control Plan would prevent any degradation of surface water resources. Groundwater would not be significantly impacted by construction of the new facility. Impacts to groundwater from operation (see Geological Resources) would be insignificant. If the Storm Water Erosion Control Plan is followed during construction, impacts to surface water resources would be insignificant.

Cultural Impacts to cultural resources at the Helena Airport would result from excavation, grading, and soil compaction during construction of the AASF. A Cultural Resources

Inventory identified the possibility of a buried site on the property and has recommended monitoring of the site during ground disturbing activities by a qualified archaeologist. This would reduce the potential for impacts to cultural resources.

Hazardous Materials and Hazardous Waste Management The proposed action would have a negligible impact on hazardous materials and waste management. The Apache fielding alternative would have a negligible impact on hazardous waste and materials management.

Socioeconomics As a result of the proposed action, impacts to socioeconomic resources in the Region of Influence, Lewis and Clark County, are expected to be negligible, except for a beneficial impact to the local construction economy resulting from the construction expenditures. Transportation impacts would be insignificant. Impacts from the Apache fielding alternative would be similar to those occurring under the proposed action.

CHAPTER 1
PURPOSE AND NEED FOR PROPOSED ACTION

1 PURPOSE OF AND NEED FOR PROPOSED ACTION

The National Guard Bureau is proposing to convert the existing Montana Army National Guard (MT ARNG) helicopter fleets located at the Helena Regional Airport in Helena, Montana. Currently, the MT ARNG has 18 AH-1 (Cobra) helicopters, 3 UH-1H (Huey) helicopters, 6 UH-1HA (Huey) helicopters, and 18 OH-58 (Kiowa) helicopters. The Cobras, UH-1Hs, and 13 Kiowas support the 1-189th Attack Helicopter Battalion (ATKHB). The 6 UH-1HA helicopters support the 1214th Medical Company, and 5 Kiowas support the 2-137th Aviation Battalion. The proposed action, also known as the preferred alternative, is to replace the 18 Cobra helicopters with 22 Huey helicopters and 8 UH-60 (Black Hawk) helicopters. The 18 Kiowas would be phased out-of-service by 1999.

The purpose of the proposed conversion is to allow MT ARNG to fulfill its mission requirements while increasing survivability with more advanced aircraft. Maintaining force contingency requirements can only be accomplished by providing MT ARNG with more Huey aircraft as well as the technologically improved Black Hawk. The Black Hawk increases survivability in part because it is a twin-engine aircraft. If one engine fails, the remaining operating engine would provide a greater chance of safely landing the aircraft. Other advanced survivability characteristics of the Black Hawk are discussed in Section 2.4. The proposed conversion is part of the Department of the Army and National Guard Bureau's program for modernization of the armed forces throughout the United States. The specific mission of the 1-189th ATKHB would change from performing attack functions to providing utility, mobility, and support services in combat.

To support the conversion, a new Army Aviation Support Facility (AASF) would be constructed. The existing AASF facility, located at the Helena Airport, supports three units. This facility, originally constructed in 1958, with additions in 1972 and 1978, lacks sufficient area to support current aircraft maintenance activities. The existing AASF cannot be expanded because of the lack of available space surrounding the facility. Thus, a new site and facility is needed to meet the square footage requirements space for post-conversion helicopter maintenance and security.

1-1 LOCATION OF THE PROPOSED ACTION

The MT ARNG operates out of Helena, Montana in Lewis and Clark County. The MT ARNG headquarters is located in Helena, and the AASF and the helicopters are located at the Helena Regional Airport. Helena is located in west-central Montana on the south side of an intermountain valley bounded on the west and south by the main chain of the Rocky Mountains. This intermountain valley is about 25 miles in width from north to south and 35 miles long from east to west. The average height of the mountains above the valley floor is about 3,000 feet. The communities of East Helena, Clancy, and Jefferson City

lie within 15 miles of the Helena Airport. Figure 1-1.1 illustrates the local region and vicinity. The Helena Airport is located on the eastern city limits of the city of Helena, Montana; east of Interstate Highway 15; south of the York Road and north of the Burlington Northern Railroad Tracks. The airport is owned and operated by the Helena Regional Airport Authority. The Airport serves a population of approximately 47,000 persons, with over 70 percent of these persons living in Lewis & Clark County.

1-2 SCOPE OF THE ENVIRONMENTAL REVIEW

An environmental assessment (EA), prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality Regulations, and Army Regulation 200-2, evaluates the proposed helicopter conversion, an alternative to field AH-64 (Apache) helicopters, and construction that would occur with the proposed action or the alternative. The scope of the EA addresses potential impacts to the biological, physical, and human environs of the project area from proposed construction and proposed helicopter-related activities.

To assist in identifying potential significant issues, Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) was conducted with Federal, state, county, and local agencies. Issues identified through the IICEP process are addressed in the environmental assessment. Identifying potential issues was also coordinated with representatives from the MT ARNG. Based on input received and from a review of impacts from similar ARNG and Army activities, specific areas of potential concern include air quality, noise and land use, and biological resources.

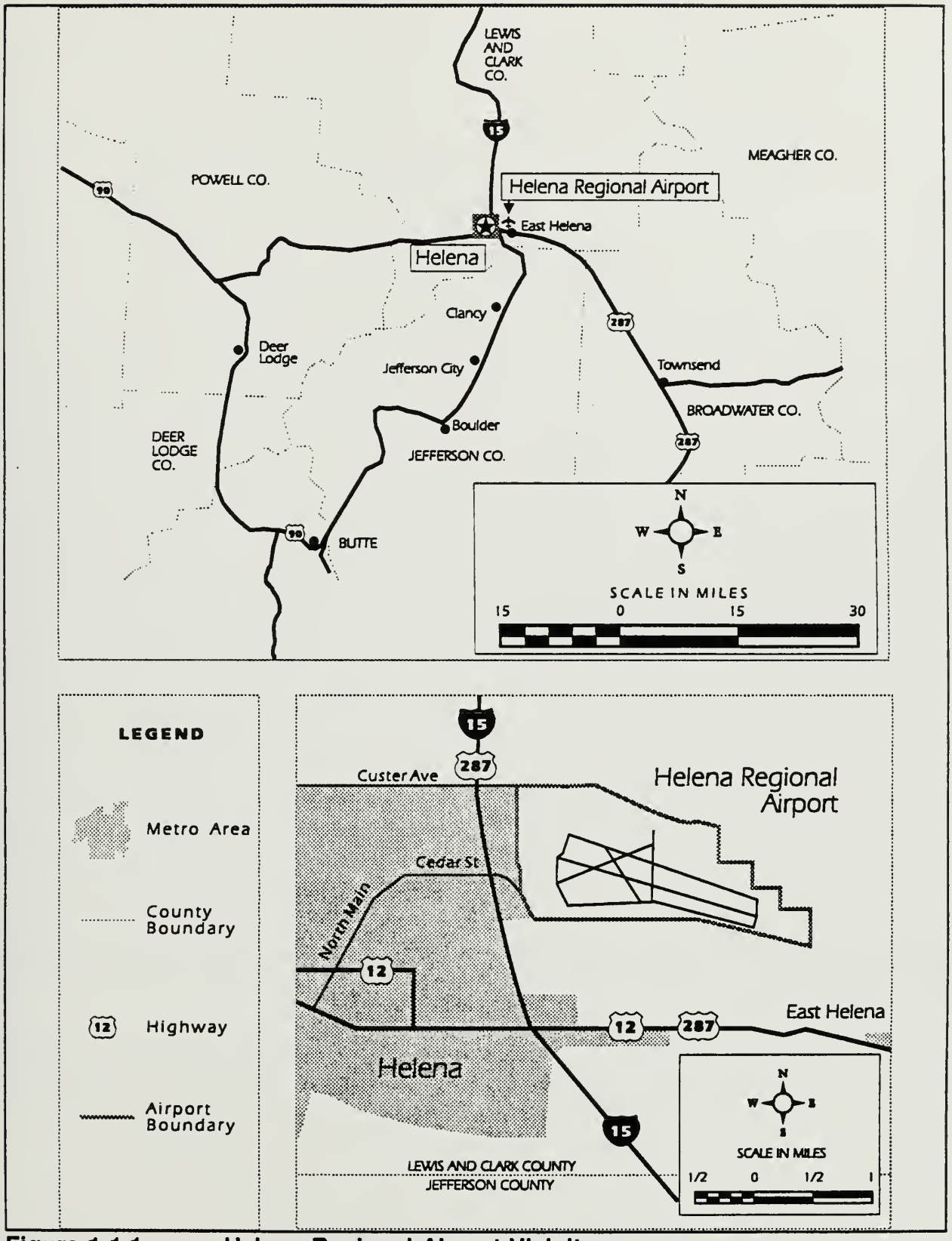

Figure 1-1.1 Helena Regional Airport Vicinity

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CHAPTER 2
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The National Guard Bureau is proposing to convert the existing Montana Army National Guard (MT ARNG) helicopter fleet located at the Helena Regional Airport in Helena. Currently, the MT ARNG has 18 AH-1 (Cobra) helicopters, 3 UH-1H (Huey) helicopters, 6 UH-1HA (Huey) helicopters, and 18 OH-58 (Kiowa) helicopters. The Cobras and UH-1Hs support the 1-189th Attack Helicopter Battalion (ATKHB). The 6 UH-1HA helicopters support the 1214th Medical Company, and the 18 Kiowas support the 2-137th Aviation Battalion. The proposed action, also known as the preferred alternative, is to replace its 18 Cobra helicopters with 22 UH-1H helicopters and 8 UH-60 (Black Hawk) helicopters. The 18 Kiowas would continue to be used for training purposes, but are scheduled to be out-of-service by 1999. The proposed conversion would be expected to occur over a period of two and one-half years.

2-1 MISSION

The MT ARNG is charged with meeting the mandate of the Constitutions of the United States and Montana, and to ensure the domestic tranquility through selfless and caring service. This is performed by providing mission-ready forces to the Federal Government as directed by the President, providing emergency support to civil authorities as directed by the Governor, and providing support to the community as approved by proper authority.

The 1-189th ATKHB's Combat Mission is to destroy enemy armored, mechanized, or other forces by aerial combat power, using firepower and maneuverability as an integral part of the combined arms team during offensive, defensive, and retrograde operations. The 1-189th ATKHB Training Mission is to develop, sustain, and improve on its ability to mobilize and deploy in support of its CAPSTONE Mission, to sustain itself for extended combat periods, and to win.

While the overall mission of the MT ARNG would not change with the proposed action, the specific mission of the 1-189th ATKHB would change. The contingency designation of the 1-189th ATKHB would change from C-1 to C-3. The C-3 designation directs the battalion to provide utility, mobility, and support services in combat as opposed to performing attack functions. The 1-189th ATKHB would be redesignated the 1-189th Helicopter Battalion.

2-2 PERSONNEL

The present battalion is authorized 277 members, but maintains 321 assigned personnel. This number would increase to 398 with the proposed conversion from Cobras to Hueys and Black Hawks. However, the number of assigned helicopter pilots (currently 46) is not

expected to change. The aviation section of the MT ARNG currently employs 64 full-time personnel (63 percent of authorized). The number of full-time personnel in the aviation section is not expected to deviate positively or negatively by more than a few slots as a result of the proposed action.

2-3 OPERATIONS

After the conversion, the MT ARNG 1-189th Helicopter Battalion would fly less than 20 percent of its operations at night (compared to the 20 percent currently flown). The number of night operations is expected to be less because of the elimination of night attack proficiency requirements. Normal training missions are one and one-half hours in duration. Night operations in the summer generally occur after 9:00 to 10:00 pm, while night operations in the winter would occur generally after 6:00 pm. The MT ARNG generates about 18 percent of the 60,000 operations that occur each year at the Helena Regional Airport. Cobra pilots fly an average of 110 hours per year. Following the proposed conversion, the same number of existing pilots would fly 96 hours per year in the Hueys and Black Hawks. The time that pilots spend in gunnery exercises would be eliminated with the conversion to Hueys and Black Hawks.

2-4 HELICOPTER CHARACTERISTICS

A comparison of characteristics for existing, proposed, and alternative action MT ARNG helicopters is shown in Table 2-4.1. Total flying hours are projected to remain similar to current flying hours. Thus, overall annual fuel consumption with the Hueys and Black Hawks would be less than fuel consumption with the existing configuration of Hueys and Cobras. Under the proposed action, the Black Hawk would be the only new type of helicopter added to the Aviation Battalion's existing helicopter inventory.

The Black Hawk is the Army's primary air assault and air movement aircraft. It is a twin-engine, single rotor, four-bladed helicopter designed to carry 11 to 14 combat-equipped troops and a crew of three. The Black Hawk is powered by the General Electric T700-GE-701C engine. The Black Hawk's survivability characteristics include low-reflective paint; no visible engine smoke or flame; crashworthy armored crew seats; redundant flight control, hydraulic and electrical systems; deicing systems; ballistic tolerant main and tail rotor system; an engine and auxiliary power unit fire detector and extinguisher system; and a "hover infrared suppression system" to reduce the infrared signature of the engine exhaust.

Table 2-4.1 Comparison of Helicopter Characteristics					
Characteristics	**Aircraft**				
	UH-1 (Huey)	**OH-58 (Kiowa)**	**AH-1 (Cobra)**	**AH-64 (Apache)**	**UH-60 (Black Hawk)**
Number of Engines	1	1	1	2	2
Max. Fuel Consumption Rate (gallons/hour)	88	21	115	121	121
Fuel Capacity (gallons)	225	70.3	262	376	362
Rotor Wash Speeds[a] (miles per hour)	ND[b]	39	55	64	64

[a] The data do not indicate the altitude or speed of the helicopters of for the calculated rotor wash speeds.
[b] ND = No data available

Source: IDARNG, 1993; MT ARNG, 1993 (Martinka)

2-5 ARMY AVIATION SUPPORT FACILITY

An Army Aviation Support Facility to house the Hueys and Black Hawks is proposed for construction at the Helena Regional Airport. Only unit and intermediate level maintenance would occur at the AASF. This is similar to current maintenance levels for the Cobra. Unit-level maintenance might involve changing an engine, while intermediate levels would involve some engine disassembly to perform repairs. No depot level maintenance such as disassembling a complicated fuel control mechanism or avionics component would occur at the AASF. Depot level maintenance would likely occur at the Aviation Classification Repair Activity Depot (AVCRAD) in Fresno, California or the Corpus Christi Army Depot (CCAD).

2-5.1 Function and Scope

The function of the proposed new 123,929 square foot AASF (see Figure 2-5.1) is to provide a facility for controlling the utilization and operation of the assigned aircraft. Approximately 857,000 square feet of ground would be disturbed for rigid (75,909 square yards) and flexible (19,353 square yards) pavements to accommodate exterior site developments such as aircraft, privately owned vehicle, and government vehicle parking, as well as a maintenance hanger/cold storage hanger access aprons, taxilanes/hoverlanes and shoulders, a rearm and refuel pad, connecting taxiways, aircraft wash platform, hardsurfaced secure storage area,

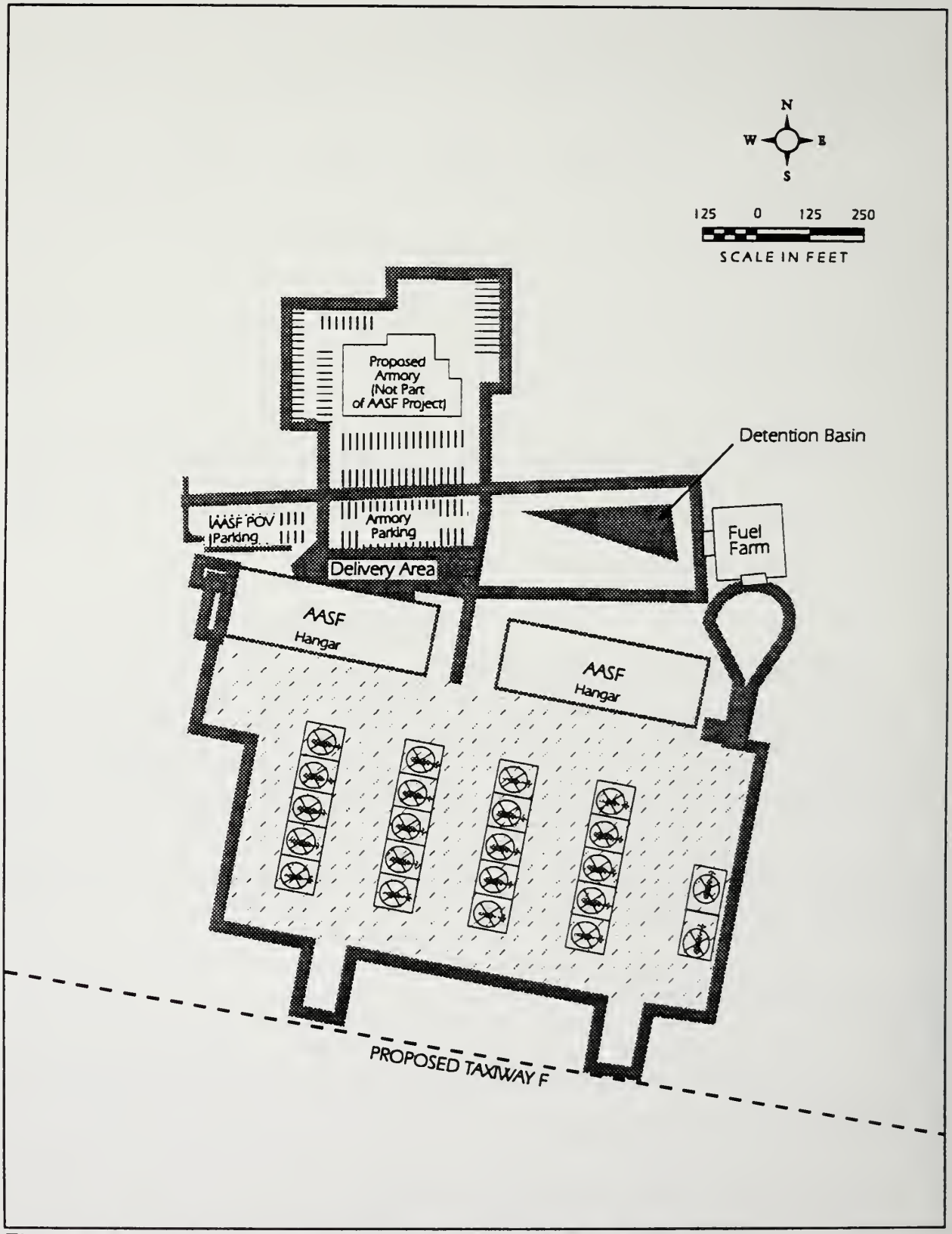

Figure 2-5.1 The Proposed Army Aviation Support Facility

and an above-ground storage tank pad.

The AASF has six primary functions: aircraft maintenance; aircraft storage; aircraft parking; site circulation; aircraft fueling; and facility administration. The AASF would provide for aviation safety, aviator and crew member flight training and readiness, performing necessary inspection, maintenance, repair, and modifications on the rotary winged aircraft, and for storing, fueling, take-off and landing, and parking of the aircraft. The facility will be used to maintain aircraft and crews in a readiness state to be used for training exercises, natural disaster relief, or combat support. The approximate cost of AASF construction is estimated at $10 million.

Aircraft fueling would occur by trucks loaded at the proposed fueling farm. The fueling farm provides for the receiving, storage, and delivery of JP-8 fuel to the aircraft on the parking and refueling pads. The current helicopter fueling system, consisting of two 20,000 gallon underground storage tanks (USTs), would be replaced by a new system. The new system would consist of two 25,000-gallon fuel cells, and associated structures, for the filtering and pumping functions. Facilities for the supply and removal of the fuel would be provided, meeting fire safety codes, OSHA standards, State of Montana siting requirements for fuels and their containment, and National Guard criteria for location and separation from other facilities.

Construction of a new AASF would allow the existing support facilities to continue to house the centrally scheduled C-12 operations (State Area Command Aviation Section), armory functions, operations center, scheduling, and contractor support, as well as other state activities.

2-5.2 Location

As shown in Figure 2-5.2, the proposed AASF site is located in the north-central portion of the airport, beginning approximately 750 feet north of the air carrier Runway 9/27. The airport site provides an ideal place for the MT ARNG Aviation Battalion to operate because it provides an elevated level of safety and services. Airport equipment and services, such as approaches for instrument flying, tower control, and crash/fire response teams, would be available to the Guard. The airport location would optimize cost efficiencies afforded by the cooperation between the MT National Guard, Helena Regional Airport Authority, U.S. Department of Agriculture (Forest Service), and the Montana Department of State Lands.

2-5.3 Real Property

The AASF is proposed for construction on the southern portion of a 75-acre parcel owned by the U.S. Department of Agriculture, Forest Service. The Department of Agriculture has issued a long-term Special Use Permit allowing the MT ARNG to use a portion of the subject

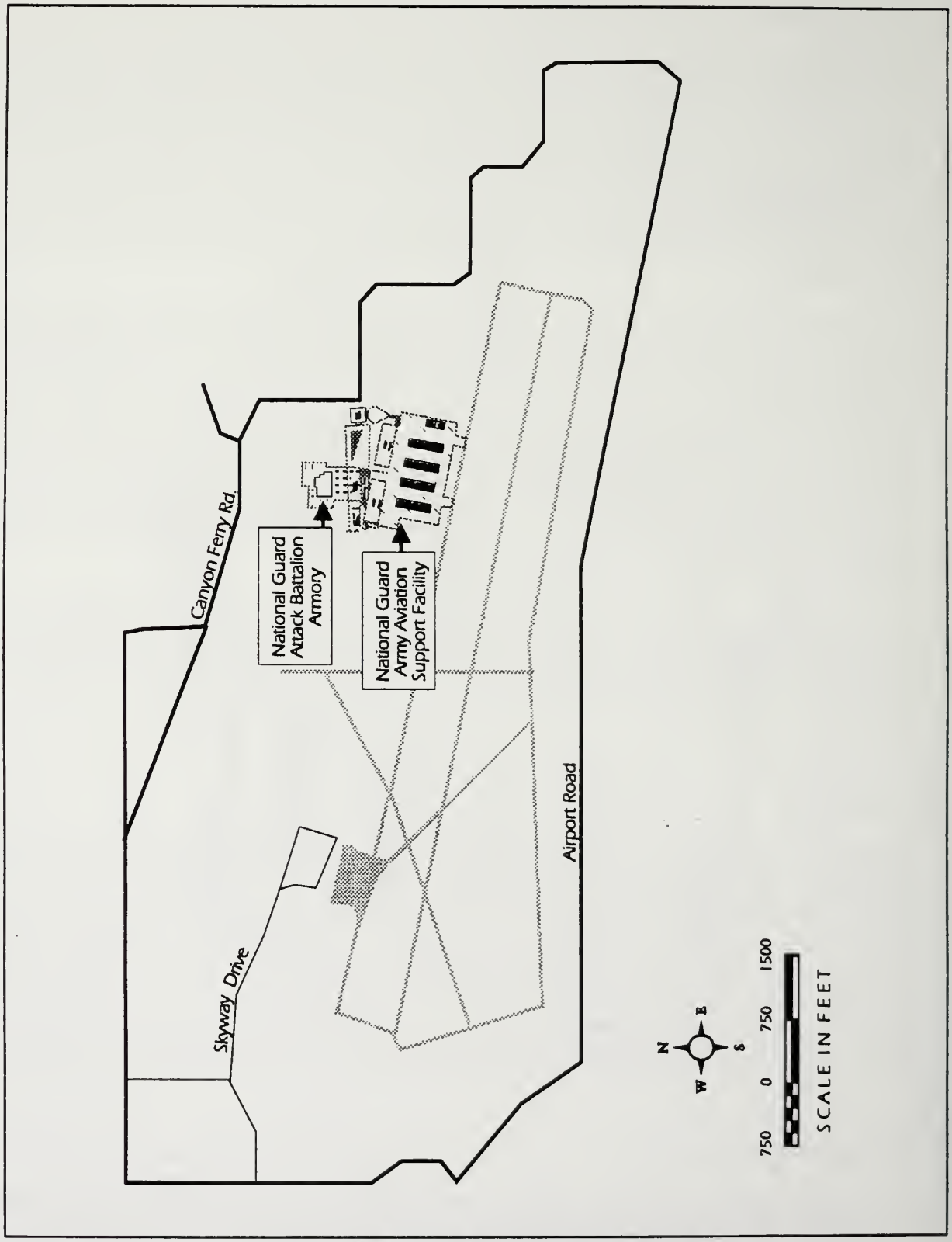

Figure 2-5.2 Location of Montana Army National Guard

property. After the proposed construction is complete, the Department of Defense may acquire jurisdiction of the real property. The property for the AASF is located in Section 22, Township 10 North, Range 3 West of Lewis and Clark County.

Prior to issuing the Special Use Permit, the U.S. Forest Service conducted an environmental audit on the real property. The audit examined and inventoried the real property for the presence of floodplains, wetlands, cultural resources, and hazardous substances. No problem areas were discovered and the issuance of the Special Use Permit was recommended. The MT ARNG reviewed the environmental audit and found that it satisfied Federal, state, and Army regulations pertaining to real property transactions.

2-5.4 Other Design and Infrastructure Considerations

All AASF functions and design criteria would be based on the Black Hawk, which would also provide the necessary design criteria considerations for the Apache (see Apache Fielding Alternative, Section 2-7.1) and smaller assigned aircraft.

The proposed AASF site is vegetated, and site features or structures are virtually non-existent. A chain link fence exists along the southern boundary line of the property. This fence is shared by both the proposed for the AASF and the Helena Regional Airport. Additionally, a 10-inch natural gas line owned by the Montana Power Company and a 24-inch water main exist on the property. The water main crosses the northwest corner of the site. Other than possibly removing or replacing (or modifying) the existing chain link fence, no existing features or structures would require demolition, removal, or modification to accommodate the AASF. No other features or structures in other areas would require demolition, removal, or modification to accommodate other proposed conversion activities. Properties adjacent to the new AASF site are all planned for aeronautical or military uses.

All utilities that are necessary at the AASF are either available nearby or are proposed to be brought to the adjoining Armory site. A natural gas boiler would be installed to heat the AASF. The 24-inch water main crossing the proposed AASF site has sufficient capacity to deliver water to the AASF, as it is one of the main supply lines for the City of Helena. The main is directly connected to the Missouri River Water Treatment Plant, located approximately 4,700 feet to the northeast. A pressure reducing valve installed at the adjacent armory would allow water to be delivered to the AASF at a usable pressure (less than 125 psi). The AASF would connect to a sewage lift station on the north side of the Armory. Electricity (primarily generated by hydroelectric facilities) would be available from Montana Power Company and would be brought in via underground transmission lines from the adjacent Armory. Telephone communication lines for the AASF would be available from US West and would also be underground. Fire hydrants would be placed in accordance with Montana Department of Health and Environmental Sciences (DHES), State Fire Marshall, and the Insurance Services Office recommendations.

The storm drainage system would be constructed to efficiently convey storm runoff around and through the site. The system would collect runoff from the apron pavement through grate inlets. The runoff generated from the AASF would be conveyed through 36-inch reinforced concrete pipe to a detention pond. Water would be released from the detention basin to the existing drainage.

2-6 TRAINING AREAS

The Huey and Black Hawk battalion would use existing training areas, no new training areas would be required for the conversion. Gunnery training occurs at Limestone Hills and low level training flights occur along selected routes within a 100 mile radius of Helena. The MT ARNG currently has formal land use agreements for thousands of acres of training land consisting of local training areas, impact areas, and ranges. The Huey and Black Hawk battalion would use the following areas for training: Limestone Hills, Sieben, Ft. Harrison, Lone Mountain, and Twin Bridges. These training areas are shown in Figure 2-6.1. Training in these areas would remain relatively unchanged with the conversion. The areas discussed below, with the exception of Sieben Local Training Area (LTA), are not used during the general rifle big game season (generally from the last week in October through the end of November). The Sieben LTA is not used from mid-September through the end of November.

Nap of the earth (NOE) flying may occur in any of the training areas. Training of this type involves flight at varying airspeeds as close to the earth's surface as vegetation, obstacles, and ambient light will allow, while generally following the contours of the earth.

Limestone Hills Training Area

The only gunnery range used by the aviation battalion (1-189th Attack Helicopter Battalions) in the state of Montana is at the Lemieux Multi-Purpose Range located at Limestone Hills, approximately 30 miles southeast of Helena. This training area has been used by the MT ARNG since the mid-1950's. Training in this area consists of low-level (below 500 feet) helicopter flights, gunnery training, and ground maneuvers. On occasion, the helicopters land and perform power checks before taking off for low-level training. While Apache gunnery training would occur at Limestone Hills with the Apache fielding alternative (see Section 2-7.1), firing of the Apache Hellfire missile would not occur in this area. Firing of the Hellfire missile may occur at Gowen Field in Idaho. The Gunnery training does not and would not occur from the November 30th through April 15th in this area because it is a major wintering wildlife area.

Lone Mountain Training Area

This training area has been used by the MT ARNG since the mid-1970's. Training in this area consists of low-level (below 500 feet) helicopter flights. While informal land-use

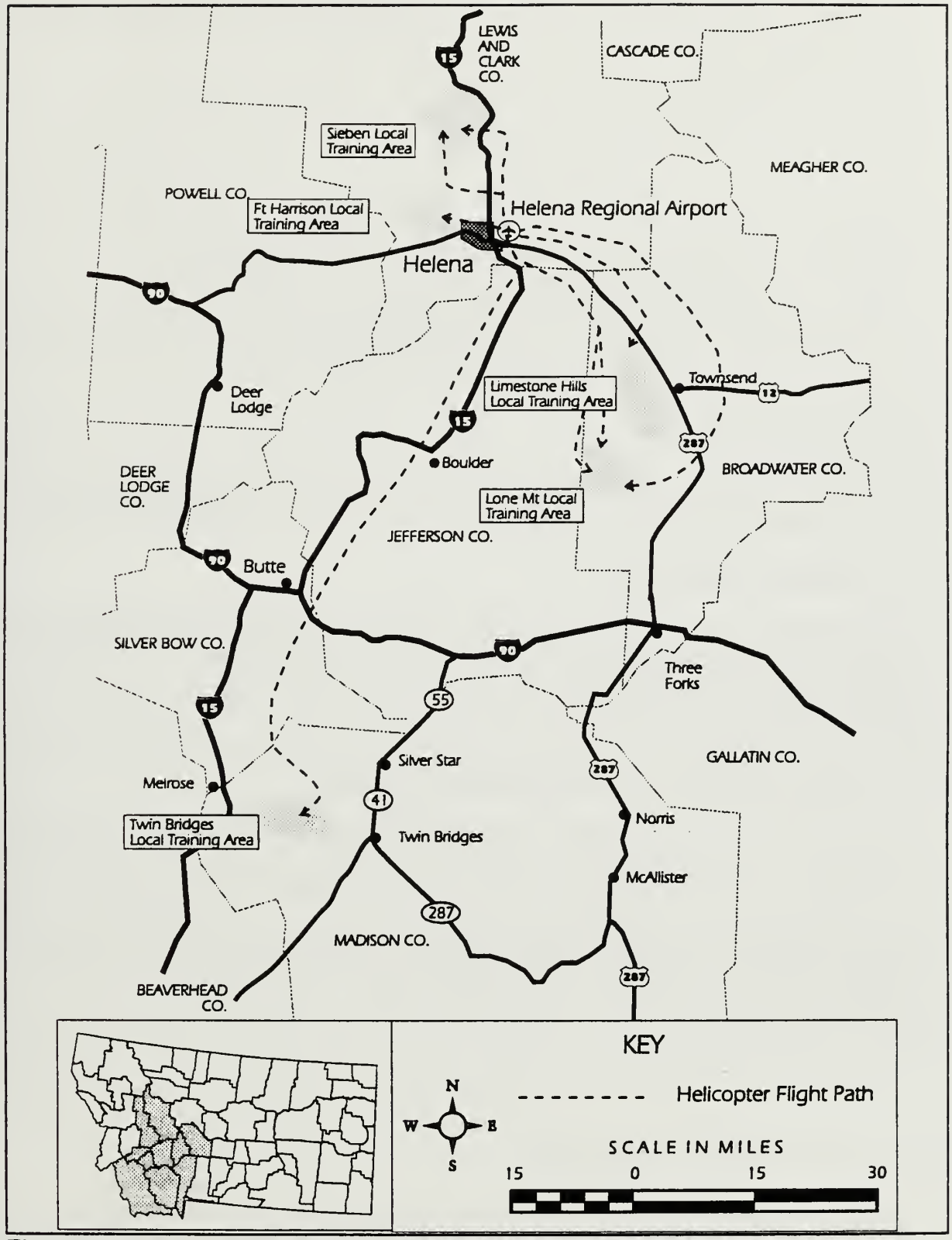

Figure 2-6.1 Montana Army National Guard Training Areas

agreements have been obtained from the 15 landowners in this area, formal agreements are yet to be established.

Ft Harrison Training Area

This training area has been used by the MT ARNG for low-level (below 500 feet) flight training and other training activities since 1960. Helicopters practice "touch and go's" and hovering on a landing strip at Ft Harrison. The landing strip is also known as Marshall Drop Zone. Occasionally C-141s and C-130s will use this area for dropping 15 pound practice bundles and parachuting of personnel. The area is also used for several other types of training such as infantry tactics and as a vehicle test track for driver training. Ranges for pistol (.45 caliber), M-16 (.223 cal.), M-60 (.308 cal.), practice M-703 (grenade), and subcaliber (practice projectile) Light Anti-tank Weapon (LAW) also exist in this area.

Sieben Training Area

This training area has been used by the MT ARNG for low-level (below 500 feet) flight training since the 1970s. Helicopters land and perform power checks in this area.

Twin Bridges Training Area

The MT ARNG started using this training area for low-level (below 500 feet) flight training in 1992. This land is owned by the Bureau of Land Management. No landings or power checks are performed at this training area.

2-7 ALTERNATIVES TO THE PROPOSED ACTION

Two alternatives to the proposed action are being considered as part of this environmental assessment. The first alternative is field AH-64 (Apache) helicopters (the Apache fielding alternative), and the second alternative (the no action alternative) consists of not converting the helicopter fleet as outlined in the proposed action or Apache fielding alternative. Additionally, two means of implementing the proposed action or the Apache fielding alternative were considered in planning process. These implementation alternatives pertained to siting options for the proposed AASF.

2-7.1 Apache Fielding Alternative

As an alternative to the proposed action, the National Guard Bureau is proposing to field the Apache helicopter. This would involve converting from the Cobra helicopter to the Apache, and adding 3 Black Hawk helicopters to the MT ARNG aircraft inventory. The Apache is

the current state-of-the-art attack helicopter. The Black Hawk helicopter is a service ship designed to carry fuel, ammunition, and personnel. All mechanics and pilots would be cross-trained on the new Apache helicopter. The proposed conversion, including construction of an AASF as described for the proposed action, would be expected to occur over a period of two and one-half years. Table 2-7.1 shows the helicopter inventory scenarios for the proposed action and alternatives.

Table 2-7.1
MT ARNG Aviation Battalion Helicopter Inventory Scenarios

	Huey	Kiowa	Cobra	Apache	Black Hawk	Total
Proposed Action	22	18[a]	0	0	8	48[b]
Apache Fielding	6	18	0	18	3	45
No Action	9	18	18	0	0	45

[a] Would decrease to zero by 1999
[b] Would total 30 by 1999

2-7.1.1 Mission

The overall missions of the MT ARNG and the 1-189th ATKHB would remain unchanged as a result of this alternative. The AH-64 Apache has been designed for a slightly different purpose than the AH-1 Cobra, that purpose being deep strike capability. Both the Combat and the Training Mission of the 1-189th ATKHB would remain as described in Section 2-1 above.

2-7.1.2 Personnel

The present battalion is authorized 277 members, but maintains 321 assigned personnel. This number would increase to 301 with the proposed conversion from Cobras to Apaches. However, the number of assigned helicopter pilots (currently 36) is not expected to change. The aviation section of the MT ARNG currently employs 64 full-time personnel (63 percent of authorized). The number of full-time personnel in the aviation section is not expected to deviate by more than a few slots as a result of the Apache fielding.

2-7.1.3 Operations

After the conversion, the MT ARNG 1-189th Attack Helicopter Battalion (ATKHB) would fly 60 percent of its operations at night versus the 20 percent currently flown. This is a result

of the advanced night capabilities of the Apache. Normal training missions are one and one-half hours in duration. Night operations in the summer generally occur after 9:00 to 10:00 pm while night operations in the winter would occur generally after 6:00 pm. Approximately 60,000 operations occur each year at the Helena Regional Airport. Of these operations, approximately 18 percent are generated by the MT ARNG. Cobra pilots fly an average of 110 hours per year. Following the proposed conversion, the same number of Cobra pilots would fly 140 hours per year, a 27 percent increase in flight time. The amount of time pilots spend in gunnery exercises is not projected to change. The Apache has a deep strike mission and, subsequently, the increase in flight time would likely originate from slightly longer flights to the more distant training areas such as Twin Bridges.

2-7.1.4 Helicopter Characteristics

A comparison of the types of ammunition for Cobra helicopter and the Apache helicopter is presented in Table 2-7.2. Table 2-4.1 in Section 2-4 above provides additional information on Apache and Black Hawk helicopter characteristics. Based on the data presented in Table 2-4.1 and the estimated flight hours under the Apache fielding alternative, overall fuel consumption for the MT ARNG Aviation Battalion would increase for this alternative.

The Apache is an advanced attack helicopter able to find, engage, and destroy targets, including enemy armor forces during day, night, and bad weather. The Apache is operated by a crew of two, seated in tandem. At a mission weight of 14,815 pounds, the Apache is powered by two General Electric T700-GE-701 turbine engines rated at 1,800 shaft horsepower each. The four blade main rotor system is fully articulated. The tail rotor also has four blades. Maximum level flight speed is 183 miles per hour and the service ceiling is 20,000 feet. The self-deployment range is more than 1,000 nautical miles. Alternate mission endurance is 2.6 hours, carrying eight Hellfire antitank missiles and 320 rounds of 30-mm cannon ammunition, at a speed of 146 knots. Survivability characteristics are similar to and more advanced than those of the Black Hawk discussed in Section 2-4 above.

2-7.2 No Action Alternative

If the proposed conversion is not implemented, the MT ARNG mission, current operations, and environmental effects would remain unchanged. However, normal minor upgrades of existing equipment could occur. The current AH-1S Cobras could be modified to AH-1F Cobras. This modification entails eliminating the 7.62MM Mini Gun, and converting from a 40MM Practice M385 LKD to a 20MM Gun. The Cobra modification would not have any

Table 2-7.2 Ammunition Type by Aircraft	
AH-1S Cobra	AH-64 Apache
7.62MM 4 Ball-1TR F/Mini Gun	30MM Cannon
40MM Practice M385 LKD	2.75 in Rocket
2.75 in Rocket Hydra 70 IMP Sig MK66	Hellfire (Not approved to fire in Montana)
TOW Practice	
MT ARNG, 1993 (Oljar, Correspondence Memo.)	

effect on the current operation of the 1-189th ATKHB and would not be expected to generate any additional environmental effects.

2-7.3 Implementation Alternatives

Two alternative means of implementing construction associated with either the proposed action or the Apache fielding alternative are discussed below.

2-7.3.1 Build the AASF at Ft. Harrison

The alternative to build the AASF at Ft. Harrison was considered early (1985) in Apache fielding planning stages but was eliminated from further consideration. Necessary support facilities, such as an Instrument Landing System (ILS), runway and fire station, would need to be constructed at Ft. Harrison making this alternative cost prohibitive, especially in light of current Department of Defense and National Guard Bureau monetary constraints. The Apache and Black Hawk are ILS aircraft, but Ft. Harrison has no ILS capabilities. Operating out of Ft. Harrison would not allow pilots to maintain ILS landing proficiency. The Montana Regional Airport has an active ILS runway.

Because this implementation alternative is not feasible with regard to accommodating either Apache or Black Hawk requirements, it has been eliminated as a reasonable alternative and is not analyzed further in this document.

2-7.3.2 Expand/Renovate Existing AASF

The present AASF was constructed in three intervals. A main armory was constructed in 1958. Two subsequent additions were made to the main armory: a main hanger addition in

1972 and the western shop addition in 1976. In total, the existing AASF encloses 34,248 square feet. The current space utilization is completely ineffective because of overcrowding. Additionally, the existing facility does not have the floor space to maintain the fleet at current standards. The airport and private industries have expanded and grown around the existing AASF, leaving no room for expansion to accommodate the Apache or Black Hawk aircraft. Both the Apache and Black Hawk are larger helicopters than the Cobra, and both have one rotor with four blades versus one rotor with two blades on the Cobra.

Under this implementation alternative, the newly formed Huey/Black Hawk or Apache Helicopter Battalion would be forced to do helicopter maintenance, repairs, and training in existing facilities. These facilities would be inadequate (e.g., ceiling heights in portions of the facility would make some Apache or Black Hawk maintenance tasks unfeasible). This would have a detrimental effect on troop morale, unit readiness, and recruiting and retention of personnel. Constraints surrounding the existing facility would not allow for adequate security necessary for the Apache or Black Hawk helicopters. Therefore, a new AASF is needed to house the Apache and/or Black Hawk helicopters, and would serve as an efficient and secure operation and maintenance center.

Similar to the Ft. Harrison siting alternative discussed above, this alternative is not feasible with regard to accommodating Apache or Black Hawk requirements. Thus, it has been eliminated as a reasonable alternative and is not analyzed further in this document.

2-8 DESCRIPTION OF POTENTIAL CUMULATIVE FUTURE ACTIONS

The Helena Airport has planned for the management and development of airport lands and facilities in anticipation of future requirements. Other construction projects ongoing and planned at the airport include: proposed construction of Taxiway "F" in FY95 by the Helena Regional Airport Authority prior to construction of the proposed AASF; a Regional Fire Training Center to be installed by the Helena Regional Airport to the east of the proposed AASF; the MT ARNG Attack Battalion Armory under construction to the North of the proposed AASF; and a proposed airport fire station to the west of the proposed AASF.

Another action that could have cumulative effects on the MT ARNG is the scheduled deactivation of the 163rd Armored Brigade in FY95. The 163rd Armored Brigade comprises 83 percent of the Montana Army Guard. Currently, it is unknown what type of follow-on units would replace lost Brigade elements. However, a rough parity in personnel strength would be retained.

2-9 SUMMARY OF POTENTIAL IMPACTS

Based on the correspondence with State and Federal agencies, several areas of potential concern associated with the proposed action have been identified. Table 2-9.1 summarizes

the potential impacts from implementing the proposed action, the Apache fielding alternative, and the no action alternative. The degree of impact is listed as significant (meaning significantly adverse), insignificant with required mitigation, insignificant, negligible, no impact, or beneficial (meaning significantly beneficial) for each resource area of concern. Both short-term (during construction) and long-term (life span of the project) impacts are assessed. The criteria to define the degree of impacts in unique to each resource area and is discussed in Chapter Four under each resource section.

Table 2-9.1
Summary of Impacts from the Proposed and Alternative Actions

Resource Area of Concern	Proposed Action	Apache Fielding Alternative	No Action
Geology	ST: Insignificant with Mitigation LT: Insignificant with Mitigation	ST: Insignificant with Mitigation LT: Insignificant with Mitigation	No Impact
Air	ST: Insignificant with Mitigation LT: Insignificant	ST: Insignificant with Mitigation LT: Insignificant	No Impact
Noise	ST: Insignificant LT: Insignificant with Mitigation	ST: Insignificant LT: Insignificant with Mitigation	No Impact
Biology	ST: Insignificant LT: Insignificant	ST: Insignificant LT: Insignificant	No Impact
Water	ST: Insignificant LT: Insignificant with Mitigation	ST: Insignificant LT: Insignificant with Mitigation	No Impact
Cultural	ST: Insignificant LT: No Impact	ST: Insignificant LT: No Impact	No Impact
Environmental Programs	ST: Insignificant LT: Insignificant	ST: Insignificant LT: Insignificant	No Impact
Socioeconomics	ST: Beneficial LT: Insignificant	ST: Beneficial LT: Insignificant	No Impact

ST: Short-term impact
LT: Long-term impact

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CHAPTER 3
AFFECTED ENVIRONMENT

3 AFFECTED ENVIRONMENT

The affected environment is the baseline against which potential impacts caused by the proposed action are assessed. This chapter focuses on the human environment that has the potential to be affected by the proposed Black Hawk and Huey helicopter conversion or alternative actions and proposed construction of the AASF at Helena Regional Airport. As stated in 40 CFR §1508.14, the human environment potentially affected is interpreted comprehensively to include the natural and physical resources and the relationship of people with those resources. The approach to defining the environmental baseline was to first identify potential issues and concerns of the proposed action, as discussed in the introduction to Chapter 4. Then, relevant environmental characteristics were determined and described.

3-1 GEOLOGICAL RESOURCES

This section of the EA describes geological resources which includes the physical surface and subsurface features of the earth such as topography, geology, soils, and the seismic nature of an area.

3-1.1 Physiography/Geology

The MT ARNG facility is located on the edge of the Helena Valley, a northwest-trending oval-shaped basin covering about 160 square miles. The valley is bounded on the west by the Scratchgravel Hills, on the southwest by the main range of the Rocky Mountains, on the south by the Elkhorn Mountains and Boulder batholith, the Big Belt Mountains to the north, and the Spokane Bench to the east (see Figure 3-1.1). The western part of the valley is gently sloping, while the eastern portion of the valley consists of low rolling hills.

Mount Helena, on the southern edge of the city of Helena, rises to approximately 5,460 feet. Elevations within the valley range from 3,652 feet at Lake Helena to 4,200 feet at the edges of the valley. Elevations at the proposed AASF site range from 3,800 feet in the northeast corner to 3,840 feet in the southwest corner and along the southern edge. The land generally slopes downward toward the north. An intermittent stream, running from the southwest corner to the northeast corner of the site has carved a small channel about 5 to 10 feet deep through the middle of the site. The land has been previously disturbed from farming and airport activities.

A slope wash deposit, approximately 20 feet thick, underlies the soil at the Helena Airport, including the proposed site for the AASF. Slope wash is comprised of soil and rock material deposited on slopes by the action of gravity and by surface water runoff not concentrated into stream channels. These deposits consist of beds of coarse gravel interlayed with thin

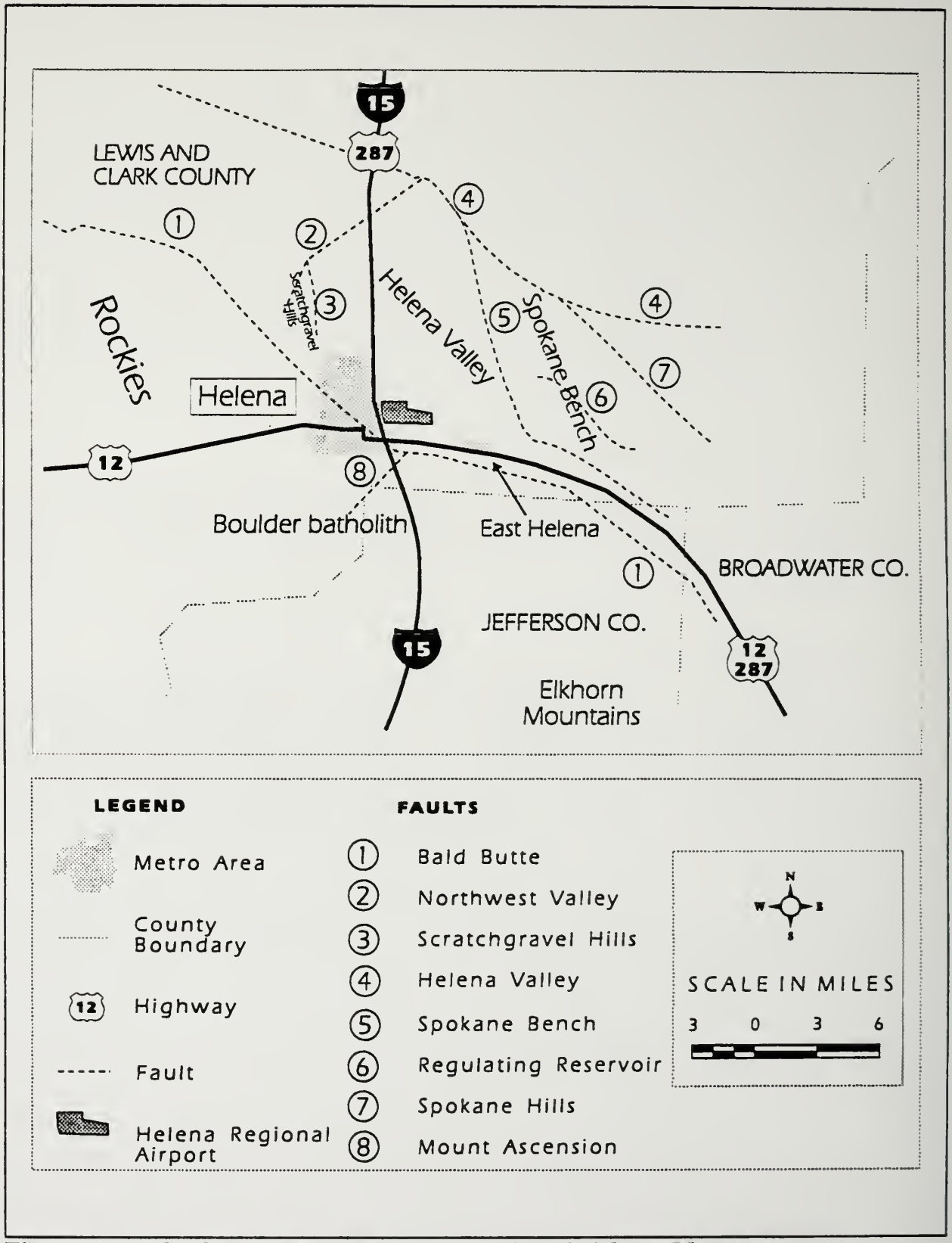

Figure 3-1.1 Geologic Features in the Vicinity of Helena, Montana

irregular beds and lenses of silt and clay. The gravel, in a matrix of sandy and silty clay, is composed of fragments of quartzite, shale, and limestone. In general, the material is thoroughly compacted and appears to be stable mechanically, as slumping and subsidence were not observed in these deposits (USGS, 1986).

Stream and lake deposits underlie the slope wash, at a depth of about 20 feet. These fill the central portion of the Helena Valley (to the north and northeast of the Helena Airport) to a depth of up to 6,000 feet and rapidly thin toward the edges of the valley. These consist of mostly well sorted gravels, clay, silt, and sand deposited by the primary streams in the region (USGS, 1992; USGS, 1986).

Sedimentary bedrock, consisting of sandstone, shale, limestone, and dolomite, underlies the slope wash and stream deposits. This layer is several thousand meters thick. In the Helena area, these rocks are inclined at moderate to steep angles as a consequence of the bending and tilting of the rocks by forces that formed the Rocky Mountains.

3-1.2 Soils

The soils in the vicinity of Helena are classified as Calciorthids. These are mineral soils which form in dry climates and have a layer of calcium carbonate enrichment at least 6 inches thick within 40 inches of the surface. These soils formed in alluvial terraces or fans in deposits of primarily sands and gravels. The soil at the site of the proposed AASF has been classified by the Soil Conservation Service as Musselshell- Crago complex, with 2 to 8 percent slopes (USDA, undated). These soils have a surface layer of loam extending to a depth of 4 inches. The soils have a gravelly loam texture from 4 to 34 inches, a gravelly sandy loam from 34 to 50 inches, and a layer of gravelly loam from 50 to 60 inches in depth. The depth to bedrock is greater than 60 inches.

The soils have a moderately low runoff potential. The permeability is moderate (from 0.6 to 2.0 inches per hour) to a depth of 29 inches, and moderately rapid (2.0 to 6.0 inches per hour) at a depth greater than 29 inches. This soil has severe limitations for pond, reservoir, or sewage lagoon construction because of water seepage (USDA, undated). The depth to the water table is greater than 60 inches. The rate of water transmission throughout the soil is moderate.

This soil has only slight limitations for construction of structures. The shrink-swell potential (the fluctuation in volume with moisture changes) is low. The potential frost action (changes in soil properties—such as heaving, excessive wetting, or loss of strength—from freezing or thawing of soil) is moderate. The hazard of water or wind erosion is slight.

As no construction or ground disturbance would occur along the routes to the training areas or at the training areas as a result of the proposed action, no impacts to geological resources along the routes or in the training areas are anticipated. Therefore, the discussion of

geological resources at these locations is not presented and further analysis is not carried through to the environmental consequences section of this document.

3-1.3 Seismicity

Area Faults

The Lewis and Clark Line, a 10 to 50 kilometer (6 to 30 mile) wide zone of faulting, separates an area of sedimentary, volcanic, and plutonic rock south of Helena Valley from an area of sedimentary rock in and north of the Helena Valley. Two major faults that are believed to mark the eastern segment of the Lewis and Clark Line are present in the Helena area. The Bald Butte Fault, forming the southern boundary of the line, runs about one mile south of the Helena Airport and the proposed site of the AASF. The Helena Valley Fault, forming the northern boundary of the line, is located approximately 7 miles from the proposed site. The location of both of these faults is shown in Figure 3-1.1.

The Bald Butte Fault was the locus of many small earthquakes in 1973 and is believed to be the most seismically active fracture in the area. Vertical displacement along the fault varies from less than 200 meters (approximately 650 feet) to more than 4,400 meters (14,400 feet). Recent movement of the fault is believed to be horizontal rather than vertical (USGS, 1986).

The Helena Valley Fault follows the northern edge of the Helena Valley. Vertical displacement is believed to be similar to the Bald Butte Fault. The epicenter of the main shock of the 1935 Helena earthquake and several smaller earthquakes in 1973 lie near the Helena Valley Fault, suggesting that these events originated from this fault (USGS, 1986).

Other potentially active faults near the Helena Airport include the Spokane Bench Fault, the Regulating Reservoir Fault, and the Spokane Hills Fault. These faults, shown in Figure 3-1.1, are 4, 5½, and 8 miles northeast of the Helena Airport, respectively.

Seismic History

Several hundred earthquakes have been felt in the Helena area since it was settled in 1864. Most of the earthquakes have been of weak to moderate intensity (II to IV on the Modified Mercalli Scale, or 1.6 to 3.5 on the Richter Scale). These quakes are capable of causing only minor damage. In October 1935, a strong earthquake, with an intensity of VIII on the Modified Mercalli Scale (6.2 on the Richter Scale) struck Helena. The epicenter was about 10 miles northeast of the city center. The quake and aftershocks caused four deaths, about 50 injuries, and about $4 million in property damage. Approximately 300 buildings sustained serious damage from this event. Several other powerful earthquakes (6.2 to 7.1 on the Richter Scale) occurred in the region between 1925 and 1959 causing minor damage in Helena.

Seismic Risk

Helena lies in zone 3 on the seismic zonation map in the Uniform Building Code (International Conference of Building Officials, 1991). In this zone, earthquakes with a Modified Mercalli intensity of VIII or greater (5.5 or higher on the Richter Scale) are anticipated. Major damage would occur in poorly built or designed structures, while only slight damage would occur in buildings designed for seismic zone 3. The site lies in an area at the upper range of zone 3 (the anticipated ground motion, as measured for hard rock, in the area is 38 percent of gravity; the boundary of zone 3 ranges from 0.30 to 0.39). Primary earthquake effects include ground motion and surface faulting—a rupture caused by different velocities of movement on either side of a break in the ground. Secondary effects from earthquakes include landslides and liquefaction—the process of changing soil and unconsolidated sediments into a watery mixture following an earthquake, especially in areas of saturated sediments. Areas underlain by unconsolidated sediments, such as the slope wash underlying the Helena Airport, are more susceptible to both primary and secondary earthquake effects than areas underlain by bedrock. This is due to amplification of ground motion in unconsolidated surficial materials and, possibly, a longer duration of shaking in these materials (USGS, 1986).

3-2 AIR RESOURCES

This section on air resources describes the existing concentrations of various pollutants and the climatic and meteorological conditions that influence the quality of the air. Precipitation, wind direction and speed (horizontal airflow), and atmospheric stability (vertical airflow) are factors that determine the extent of pollutant dispersion.

3-2.1 Climatology and Meteorology

Helena is located on the south side of an intermountain valley bounded on the west and south by the main chain of the Rocky Mountains. The valley is approximately 25 miles from east to west and 35 miles from north to south. The average height of the mountains above the valley floor is 3,000 feet.

The Helena Valley has a semiarid climate that is typical of areas in Montana near the Continental Divide. Factors affecting the climate include invasions of maritime air masses from the Pacific Ocean and drainage of cool air into the valley from the surrounding mountains. The mountains to the north and east deflect shallow air masses of invading Arctic air to the east. Cold air that may collect in the valley may be trapped by inversions of several days duration during the winter and early spring months. These inversions can be quite pronounced.

Summertime temperatures are moderate, with maximum daily readings generally under 90°F; daily minimums are near 50°F. The extreme summer temperatures are 105°F and 18°F. Winter daily maximums are in the lower 30s; minimums are near 10 to 15°F. The lowest recorded temperature is -42°F.

Winds are generally westerly throughout the year, averaging 7-8 miles per hour. Stronger winds are also from the west with maximum gust speeds of 55 to 65 miles per hour being recorded.

Average annual precipitation is 11.37 inches. Most of the precipitation falls from April through July as frequent showers and thundershowers. May and June average 11 days with precipitation. June is the wettest month of the year with an average of 2.01 inches. Snow can be expected from September through May. Snowfall amounts from November to April average 5 to 8.5 inches per month and near 48 inches for the year. (NOAA, 1992)

3-2.2 Regional Air Quality

The National Ambient Air Quality Standards (NAAQS), established by the U.S. Environmental Protection Agency (USEPA), define the allowable concentrations of pollutants that may be reached but not exceeded in a given time period to protect human health (primary standard) and welfare (secondary standard) with a reasonable margin of safety. These standards include maximum concentrations for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter with a diameter of 10 microns or less (PM_{10}), and lead (Pb).

Areas not meeting ambient air quality standards are designated as nonattainment for the specific pollutant causing the violation. Standards are not to be exceeded more than once per year, except for O_3 and PM_{10}, which are not to be exceeded more than an average of one day per year. For example, four days with an exceedance of the O_3 standard in three years or less is a violation. Both the primary NAAQS and the Montana Ambient Air Quality Standards (MAAQS) are presented in Table 3-2.1.

Air quality is determined by comparing ambient air levels with the appropriate primary or secondary NAAQS or MAAQS for each criteria pollutant. National Primary Standards establish the level of air quality necessary to protect the public health from any known or anticipated adverse effects of a pollutant, allowing a margin of safety to protect sensitive members of the population. National Secondary Standards establish the level of air quality necessary to protect the public welfare by preventing injury to agricultural crops and livestock, deterioration of materials and property, and adverse impact on the environment.

Table 3-2.1 National and Montana Ambient Air Quality Standards				
Pollutant	Averaging Time	NAAQS		MAAQS
		$\mu g/m^3$	ppm[a]	
O_3	1 hr	235	0.12	.01 ppm
CO	1 hr 8 hr	40,000 10,000	35 9	23 ppm 9 ppm
NO_2	1 hr AAM[b]	--- 100	--- 0.05	.03 ppm .05 ppm
SO_2	24 hr Annual	365 80	0.14 ---	.05 ppm .01 ppm
PM_{10}	24 hr AGM[c]	150 ---	--- ---	150 $\mu g/m^3$ 50 $\mu g/m^3$
Pb	90 day 1 month	1.5 ---	--- ---	1.5 $\mu g/m^3$ ---

a Parts Per Million
b Annual Arithmetic Mean
c Annual Geometric Mean

Air quality in the area, at the Helena Airport, and in helicopter routes and training areas is generally very good. With the exception of lead, the project area is presently designated as an attainment area for all criteria pollutants by the USEPA. The area near the Helena Airport is in non-attainment for lead as a result of smelting operations at the ASARCO plant in East Helena. Since the existing training routes and areas avoid population centers, the present ground-level air quality in the areas overflown is likely to be relatively unaffected.

The combination of inversion strength (lapse rate and thickness of the inversion) and wind speed determine the ventilation or dilution factor for an area. Area ventilation is normally adequate to disperse most pollution. However, poor ventilation during the cooler months fosters the development of photochemical ozone, and an increase in other pollutants and particulates. Carbon monoxide and particulates reach their highest levels in late fall and winter. Montana has prescribed burning seasons to limit release of pollutants and particulates that may be trapped during inversions in the mountain valleys. Based on the burn seasons, open burning is generally prohibited during the winter months when inversions occur more frequently. A summary of monitoring results from locations in the study region are presented in Table 3-2.2. With the exception of lead in East Helena, the NAAQS were not exceeded at any of the locations shown in the table.

The quality of air affects visibility in mandatory prevention of significant deterioration (PSD) Class I Federal areas where visibility is an important value. The nearest PSD Class I area is Gates of the Mountains Wilderness Area, approximately 20 miles north of Helena. Another, the Anaconda-Pintler Wilderness Area, is approximately 75 miles southwest of Helena and approximately 60 miles west-northwest of the Twin Bridges training area.

3-2.3 Criteria Pollutant Emissions

Criteria pollutants may directly or indirectly originate from diverse mobile and stationary sources. While ozone is a regulated criteria pollutant, it is not directly emitted from sources. Ozone forms as a result of volatile organic compounds (VOCs) and oxides of nitrogen reacting with sunlight in the atmosphere.

Table 3-2.2
1992 Air Pollution in the Regional Area

Monitoring Station	Pollutant ($\mu g/m^3$)				
	Pb (90 day mean)	SO_2 (24-hr average)	PM_{10} (24-hr average)	CO	NO_2
East Helena 1	NM	113	NM	NM	NM
East Helena 2	NM	82	NM	NM	NM
East Helena 3	NM	322	NM	NM	NM
East Helena 14	4.10	NM	NM	NM	NM
East Helena 19	3.20	NM	NM	NM	NM
East Helena 26	2.35	NM	NM	NM	NM
Helena 1	NM	NM	93	NM	NM
Helena 18	NM	NM	123	NM	NM
Lewis/Clark 20	NM	NM	25	NM	NM
Lewis/Clark 24	2.08	NM	NM	NM	NM

NM Not Monitored/Measured
Source: USEPA Aerometric Information Retrieval System (AIRS), selected station reports

Ozone layer depleting compounds (ODCs) are compounds which may cause or contribute to degradation of the earth's stratospheric ozone layer. Stratospheric ozone protects health by screening unwanted ultraviolet emissions from the sun. Stratospheric ozone should not be confused with tropospheric ozone (which is regulated by the NAAQS standard and can be

harmful to human health). ODCs are listed under Section 602 of the Clean Air Act, which also specifies timeframes for the phase-out of ODCs.

The current helicopters assigned to the MT ARNG are the major source of air pollutants from MT ARNG's operations occurring out of Helena Regional Airport. Table 3-2.3 lists the criteria pollutant emissions rates of helicopters currently assigned to the MT ARNG including the Cobra. The values shown are calculated based on annual flight hours by aircraft type. The pollutants would be emitted not only in the Helena Area, but dispersed over the 100 mile radius around Helena where flight hours accrue. Other mobile sources of criteria pollutants include aerospace ground equipment and employee and government vehicles. Other stationary sources of criteria pollutants include helicopter and vehicle maintenance activities, heat plant emissions, and refueling operations.

Table 3-2.3
Criteria Pollutant Emission Rates for Assigned Cobra and Huey Aircraft (tons/year)

Aircraft Type	Carbon Monoxide	Sulfur Oxides	Nitrogen Oxides	Hydrocarbons	Particulates
Cobra* (AH-1)	10.62	1.92	11.43	8.64	N
Huey (UH-1)	6.65	1.20	7.16	5.41	N
Kiowa (OH-58)	15.34	0.59	2.66	3.73	N
Total (tons/year)	32.61	3.71	21.25	17.78	N
Total (pounds/day)	250.85	28.54	163.46	136.77	N

* Values for the Cobra were derived from Huey engine performance data
N Negligible

Source: MT ARNG, 1993; U.S. Army, 1993

3-2.4 Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than are the population at large. Sensitive receptors include long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities. Receptors in proximity to localized sources of toxics and carbon monoxide are of particular concern. There are no sensitive receptors at or within a quarter mile of the Helena Airport. There are some sensitive receptors, a convalescent home, schools, and Saint Peter's Hospital, located approximately one mile from the airport boundary (Ferguson, 1993).

3-3 NOISE

Sounds which disrupt normal activities or otherwise diminish the quality of the environment are designated as noise. Noise can be stationary or transient, intermittent or continuous.

3-3.1 Noise Descriptors

Community response to noise is based on a subjective assessment of the daily noise environment. Factors that affect this subjective assessment include the noise levels of individual events, the number of events per day, and the time of day at which the events occur. Most environmental descriptors of noise are based on these three factors, although they may differ considerably in the manner in which the factors are taken into account.

The decibel (dB) is the physical unit commonly used to describe sound levels. Sound measurement is further refined by using an "A-weighted" decibel (DBA) scale which emphasizes the audio frequency response curve audible to the human ear. Thus, the dBA measurement more closely describes how a person perceives sound. Figure 3-3.1 provides a range of sound level values in dBA for common sounds and for typical environments.

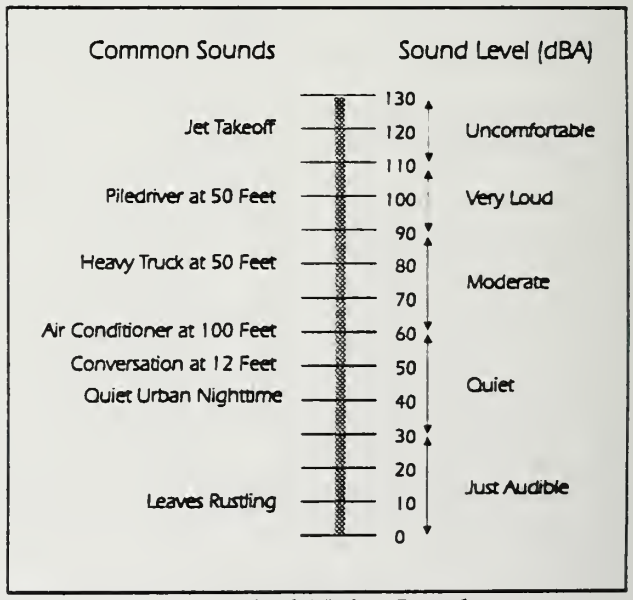

Figure 3-3.1 Typical Noise Levels

Scientific studies and social surveys that have been conducted to appraise community annoyance to all types of environmental noise have found the day-night average sound level (DNL) descriptor to be the best measure of annoyance. The DNL describes the 24-hour or daily noise environment. To compute a DNL, single noise events are measured using an A-weighted scale with corrections added for the number of events and the time of day. The A-weighted sound levels (dBA) more closely describe how a person perceives sound. A 10-decibel (dB) penalty is added for noise that occurs between the hours of 10 p.m. and 7 a.m. because nighttime noise events are considered more annoying than noise occurring during daytime. The DNL descriptor is accepted by Federal agencies, including the U.S. Army, as a standard for estimating noise impact and establishing guidelines for compatible land uses.

The U.S. Department of Housing and Urban Development (HUD) has established criteria that consider areas with noise levels of 75 DNL or greater as unacceptable living

environments. The DoD, USEPA, and other agencies consider noise levels in excess of 65 DNL as "normally unacceptable" for noise sensitive land uses such as residences, schools, and hospitals. Houses located in areas between 65-75 DNL may not qualify for Federal mortgage insurance under HUD or Veterans Administration regulations without additional costs associated with installing noise attenuation.

The Sound Exposure Level (SEL) is the scale used to describe the energy content of flyover noise. The SEL is a single event measure of the amount of noise energy from a source normalized to one second of time. Measurements of SEL tend to be higher than single peak measurements because the energy is compressed into the one-second time period. An SEL is a combination of level and duration, thus, SEL values diminish with increased altitude of an aircraft and distance from the receptor.

3-3.2 Noise Source Analysis

Noise produced by aircraft during takeoff and landing operations is of major interest. These noises fall into a broad range of "transient" noises, which come and go in a finite period of time. Depending primarily on the type of aircraft, type of operations, and distance from the observer to the aircraft, the maximum flyover noise levels vary widely in magnitude. The duration of the noise also varies depending on the proximity of the aircraft, speed, and orientation with respect to the observer.

Potential sensitive receptors near the Helena Regional Airport include a farmhouse about 1,500 feet to the north and a group of houses about ¾ mile to the northwest of the proposed site of the AASF. Scattered residences are located along the flight paths to the training areas. The Helena Regional Airport conducted a noise study as part of its Master Plan. The 65 DNL contour from this study is shown in Figure 3-3.2. Also shown in this figure is the area of land use which is regulated to minimize incompatible land use. Background noise levels near a small airport are typically about 55 dBA.

The current noise levels at Helena (Airport) are dictated by commercial aircraft. The MT ARNG helicopters (accounting for about 18 percent of the operations) negligibly influence the size and configuration of DNL contours. In addition to changes in DNL, the change in SELs serves as a means of evaluating impacts to the noise environment. The SEL noise levels for the UH-1 and AH-1 helicopters currently operated by the MT ARNG at Helena is provided in Table 3-3.1.

The flight routes and training areas experience occasional noise from overflights of helicopters. Most of the residents in these areas are accustomed to the noise generated by the helicopters. Approximately five noise complaints were registered with the MT ARNG during 1993. The complaints came within the city of Helena area. The time of noise occurrence is not known on all of the complaints, but most of the complaints resulted from night-time operations.

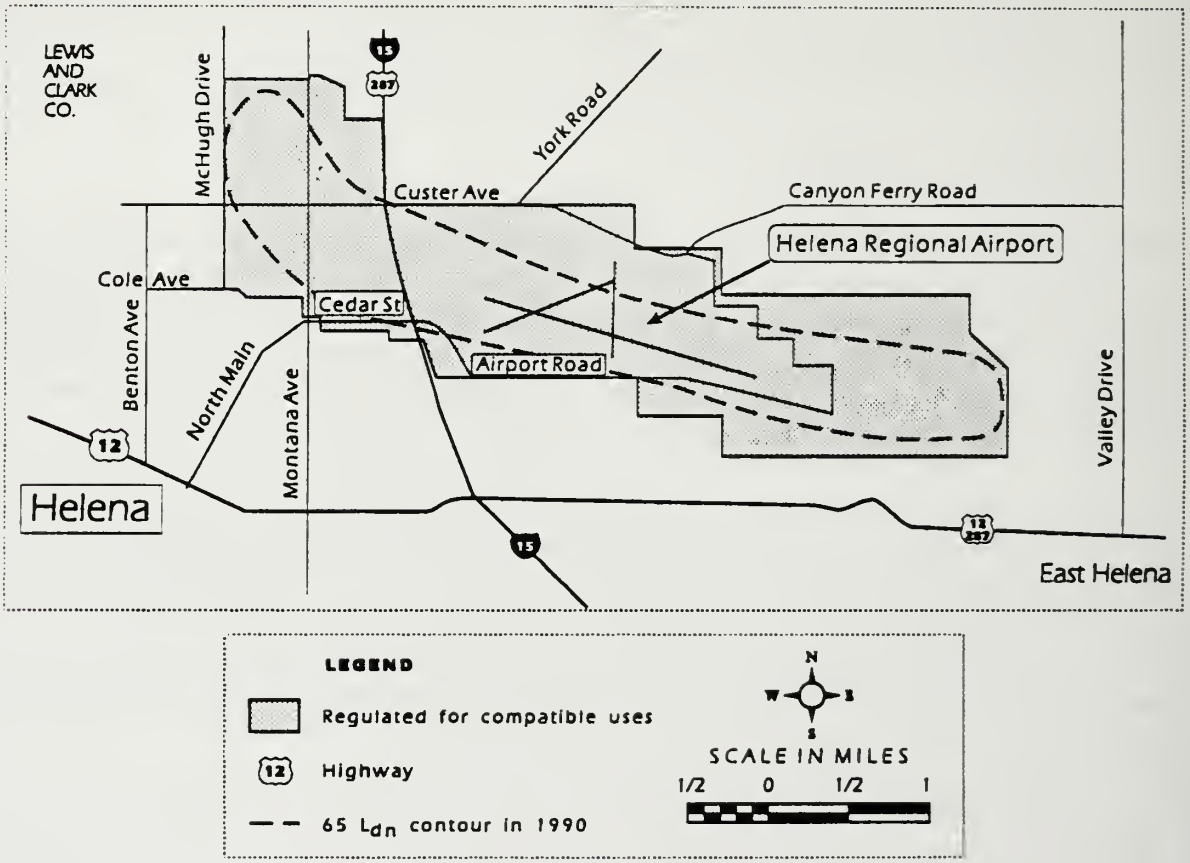

Figure 3-3.2 Current Noise Conditions at Helena Regional Airport

Table 3-3.1 Helicopter Noise Levels (Flyover) at 1,000 Feet Above Ground Level		
Distance to Side of Path (Feet)	Sound Exposure Levels, dBA	
	UH-1	AH-1
0	92	91
100	92	91
200	92	91
300	92	91
400	92	91
500	91	90
600	91	90
700	91	89
800	90	89
900	90	89
1,000	90	88
Source: U.S. Army, 1992		

3-4 BIOLOGICAL RESOURCES

For the purpose of analysis in this EA, biological resources include the native and naturalized plants and animals in the vicinity of the proposed AASF and those known to occur in the potentially affected MT ARNG helicopter routes and training areas.

The Montana Natural Heritage Program (MTNHP, 1993) was consulted for information on sensitive species near helicopter flight paths and training areas. Information provided by the MTNHP is provided in Appendix A.

3-4.1 Vegetation

The study area consists primarily of conifer forests and grassland vegetation. Vegetation is generally sparse in the Helena valley as a result of low amounts of precipitation. Vegetation characteristic of the valley and foothill areas overflown by MT ARNG helicopters consist of blue bunch wheatgrass, rough fescue, bearded wheatgrass, sumac, dogwood, and sagebrush

species. Elevations exceed 9,000 feet in the vicinity of Limestone Hills and 10,000 feet in the vicinity of the Twin Bridges Training Area. Land at these higher elevations supports vegetation typical of mountain forests with douglas-fir, ponderosa pine, grand fir, western red cedar, western hemlock, pinegrass, common snowberry, mallow ninebark, and white spirea being the major species. Fire and drought have recently resulted in significant changes in the distribution and abundance of plant communities in some portions of the study area such as west of Lone Mountain LTA.

3-4.2 Mammals and Vertebrate Species

Cattle graze over much of the study area outside the Helena Municipal Airport. Wildlife in the vicinity of the Airport consist of small mammals (nongame species), rodents, and birds. Wildlife along the helicopter routes and training areas consist of that found near the Airport as well as larger species such as elk, mule deer, and antelope. Some of the areas overflown serve as important wintering range for elk. Elk habitat areas and travel corridors are currently insignificantly affected by MT ARNG helicopter activities. The helicopter training areas and land beneath the helicopter routes are not used as calving areas by elk (MT ARNG, 1992).

No sensitive fish or other aquatic life are known to exist in the surface water drainage system within the Airport boundaries. Airport drainage runs into Prickley Pear Creek which contains a greater diversity of aquatic life than occurs in the Airport vicinity. Prickley Pear Creek, supporting a variety of fish species, drains into Lake Helena to the North. The proposed AASF site does not contain any jurisdictional wetlands.

Helicopter flight paths and landing areas for the Limestone Hills Training Area are very close to several bird rookeries, including two for sensitive or state protected species (American white pelican and Caspian tern). These rookeries are sensitive to disturbance and represent high concentrations of nesting birds which are rare in the state.

Upland gamebirds consisting of sharptailed grouse and Hungarian partridge are year-round residents in the Helena area. Because of limited cover and availability of preferred foods, the amount of upland gamebirds is limited to a few individuals/coveys (MT ARNG, 1992).

Both geese and ducks utilize the Helena Valley and its associated system of rivers and streams during migratory seasons. This migration corridor serves only a small population of geese (5,000 - 25,000) while over 3,000,000 ducks are likely to fly through this area (Bellrose, 1980). Fall migration occurs from mid-September to November and Spring migration occurs from February to mid-April.

3-4.3 Threatened and Endangered Species

A listed species, provided protection under the Endangered Species Act, is so designated because of danger of its extinction as a consequence of economic growth and development.

Townsendia spathulata (Sword Townsendia), a Category 3 Federal plant species, was documented in the Limestone Hills area during 1993. This species occupies flat unquarried ridgetops and is susceptible to disturbance. *Atragalus convallarius* (Lesser Rushy Milkvetch), a state sensitive plant species, was recorded in the Fort Harrison and Helena areas in 1993 (MTNHP, 1993).

The bald eagle (*Haliaeetus leucocephalus*) is the only endangered species recorded within the helicopter flight paths and training areas. One Federal Category 1 species, the Montana Arctic Grayling (*Thymallus arcticus montanus*), has been recorded in the vicinity of the helicopter flight path between Helena and the Twin Bridges Training Area. A mountain plover, a Category 2 Federal species, has also been sighted in the vicinity of the Limestone Hills Training Area (MTNHP, 1993). Information provided by the U.S. Fish and Wildlife Service (USFWS) indicates that no species listed or proposed for listing as threatened or endangered, other than migrant bald eagles, are likely to occur within the proposed AASF area. No nesting or roosting areas for bald eagles are present at the proposed AASF site.

3-5 WATER RESOURCES

This section describes the surface and groundwater sources, water quality and quantity, and surface and subsurface water movement in the vicinity of the AASF at the Helena Regional Airport. The hydrologic cycle involves the transport of water into various media such as the air, the ground surface, and subsurface. Natural and human-induced factors determine the quality and available quantity of water resources.

This section will address the area potentially affected by the proposed action, i.e., the site proposed for construction of the new AASF at the Helena Regional Airport. The flight routes and training areas will not be addressed in this section because water resources would not be affected beyond existing conditions.

3-5.1 Groundwater

The Helena Regional Airport is located along the southern boundary of the Helena Valley-Fill Aquifer System. The aquifer underlies an area of approximately 60 square miles. The site for the proposed AASF is partially within the aquifer. This aquifer system is a major source of domestic water for local residents. The majority of domestic water wells are less than 70 feet deep.

The valley is bounded by the Elkhorn Mountains and Boulder batholith to the south, the Scratchgravel Hills to the west, the Big Belt Mountains to the north, and the Spokane Bench to the east. Groundwater flow is generally from the southern, western, and northern margins of the valley toward Lake Helena. Groundwater flow in the vicinity of the airport is to the north-northeast.

The valley is filled to a depth of approximately 6,000 feet with fine- and coarse-grained sediments overlain with about 100 feet of alluvium. The upper few hundred feet of valley fill is composed of complexly stratified lenses of cobbles, gravel, sand, silt, and clay. Lateral discontinuity of fine-grained layers allows hydraulic interconnection of water-yielding zones, which function as one complex aquifer (USGS, 1992). Aquifer recharge is through infiltration of streamflow, leakage from irrigation canals, infiltration of excess irrigation water, and inflow from fractures in bedrock. Discharge is through leakage to streams and drains, upward leakage to Lake Helena, and withdrawals from wells.

The airport is situated on a pediment of slope wash above the valley floor. The pediments are generally up to 20 feet thick overlying bedrock and contain scattered areas of groundwater. The depth to groundwater at the proposed location is generally 12 feet or greater, however, perched aquifers are locally common and the potential for encountering groundwater at a shallower depth exists. A monitoring well located in the northeast quarter of Section 22, Township 10 North, Range 3 West (about 1,000 feet northeast of the proposed AASF site) measured water levels over a ten year period. Between June 1981 and June 1991, the depth to groundwater varied from 5.6 feet to 17.9 feet (USGS, 1992).

3-5.2 Surface Water

Regional surface waters include the Missouri River, Lake Helena and four principal streams which flow into the valley. The largest stream and the closest to the airport is the Prickly Pear which flows toward the north about three miles east of the airport. Surface drainage from the airport empties into the Prickly Pear. Water diverted from the Missouri River is used for irrigation and processed by the Missouri River Treatment Plant for domestic use in the area. The available supply of domestic water is adequate for the projected needs of the area for the foreseeable future (USGS, 1992).

An intermittent stream flows toward the northwest through the middle of the proposed location. The Helena Valley Canal, an east to west irrigation canal, is located about one mile to the north of the site.

3-5.3 Water Quality

Analysis of groundwater samples indicate that water in wells completed in the valley-fill aquifer system generally is a calcium bicarbonate type. Dissolved-solids concentrations

averaged 286 milligrams per liter (mg/L), which indicates hard water. Valley well water samples average a sodium-adsorption ratio (SAR) value of 5 or less, which indicates water with sodium levels suitable for irrigation. The median nitrate concentrations were 1.1 mg/L, where the USEPA primary maximum contaminant level (MCL) for nitrates is 10 mg/L. Volatile organic compounds (VOCs), primarily chloroform and bromodichloromethane from chlorination systems, were found in some wells in very small concentrations, ranging from 0.6 to 4.1 µg/L. None of the samples containing VOCs were located within one and one-half miles of the proposed AASF site. Pesticides were not detected. In general, groundwater quality from the valley aquifer system is good (USGS, 1992).

Currently, unprocessed surface water is not used in the area except for irrigation. Surface water quality in the area is not monitored on a regular basis. Storm water drainage from the airport is not monitored at the outfall point.

3-6 CULTURAL RESOURCES

Cultural resources are generally recognized in four categories: prehistoric, historic, paleontological, and Native American resources. Prehistoric resources are physical properties resulting from human activities predating written records. Historic resources consist of physical properties that postdate the existence of written records and include architectural structures and archaeological features such as foundations and trash pits. Native American resources are sites, areas, and materials important to Native Americans for religious or heritage reasons. Paleontological resources are the physical remains, impressions, or traces of plants or animals from a former geological age.

3-6.1 Cultural Resources

The Helena Valley was first settled in 1864. Cultural resources that might be present in the area are a result of mining, agricultural, ranching, military, and transportation activities. A cultural resource inventory was conducted on the proposed construction site by the Helena National Forest Archeologist. The purpose of the inventory was to locate historic/prehistoric sites that might lie on the proposed property. One isolated artifact was found on the surface, a jasper uniface with one worked edge. This finding suggests that their may be a possibility of a buried site on the property (Fairchild, 1991).

3-7 HAZARDOUS MATERIALS/WASTE MANAGEMENT

Hazardous materials are used and hazardous wastes are generated as a result of operations at the AASF. Operations that use hazardous materials and generate hazardous wastes include fueling, aviation repair and some maintenance on weapons systems. Most of the hazardous material used at the AASF is fuel. There are currently two 20,000-gallon

underground storage tanks (USTs) used for JP-4 (jet fuel), a 1,000-gallon MOGAS UST, and a 2,000-gallon diesel UST.

Management of hazardous wastes consists of collection, storage, transportation, and disposal as required by the Resource Conservation and Recovery Act (RCRA) and Montana Hazardous Waste Regulations (Montana Codes Annotated (MCA) Title 16, Chapter 44, Section 101 et seq). The environmental coordinator at the AASF is the installation accumulation point manager for the RCRA-permitted storage facility at the AASF. The wastes are disposed of through the Defense Reutilization and Marketing Office (DRMO) in Great Falls, Montana.

The wastes generated in the AASF consist of waste oils, recovered fuels, and solvents or paint thinners. The AASF is currently a small quantity generator of hazardous waste, and anticipates becoming a conditionally exempt small quantity generator next year (McCarter, 1994). The monthly average of hazardous waste produced from October 1992 through October 1993 was 434 pounds. Table 3-7.1 shows the hazardous wastes produced by the AASF during fiscal year 1993.

Hazardous waste quantities are decreasing. The decrease is occurring as a result of improved shop practices for sump sludge. Sump sludge is now being disposed of by landfarming in accord with appropriate regulations. In addition, JP-4 has been removed from the waste streams. Recovered JP-4 is now blended with diesel and burned in 2.5 and 5 ton trucks, or blended with used oil in the MT ARNG energy recovery program. The total estimated monthly production for FY 94 is 93.58 pounds. This is a decrease of 340.25 pounds from FY 93.

Table 3-7.1 Hazardous Wastes Produced by the AASF During FY 93	
Non-Recurrent Waste Streams	
Product	**Amount**
Dow Corning Release Coating	29 lbs
Oil/Water Separator Sump Sludge[1]	1,286 lbs
Recurrent Waste Streams	
Thinner Dope Lacquer	236 lbs
JP-4 Aviation Fuel[2]	2,768 lbs
Stoddard Solvent	887 lbs
TOTAL HAZARDOUS WASTE	5,206 lbs

[1] Sump sludge is no longer hazardous due to improved shop practices. Sump will be disposed of via landfarming.

[2] JP-4 has been removed from the waste stream effective October 1993.

3-7.1 Installation Restoration Program

Cleanup under the Installation Restoration Program (IRP) would not be affected by the proposed action. There are no IRP sites located on the property proposed for construction of the AASF. For these reasons, the IRP program will not be discussed further and will not be carried forward in this EA.

3-8 SOCIOECONOMICS

The MT ARNG helicopter fleet is located at the Helena Regional Airport, on the northeastern edge of Helena, Montana. The Helena Regional Airport also provides commercial and general air service to the Helena area and west-central Montana.

The city of Helena is located in Lewis and Clark County, which is defined as the region of influence (ROI) for this analysis. The area is shown in Figure 1-1.1.

3-8.1 Employment and Income

Total 1990 employment in Lewis and Clark County was approximately 30,400. Employment in the county grew by 19 percent between 1981 and 1990, slightly less than the United States

growth rate of 22 percent. In the State as a whole during the 1980s, however, employment increased by only 9 percent. Lewis and Clark County has a moderately diversified economy, with a high proportion of employment in the services sector, which accounts for about one-third of all employment. Helena is the state capital, and the government sector accounts for more than a quarter of county employment. Wholesale and retail trade employ 20 percent of the labor force, while the remaining sectors are quite small (U.S. Bureau of Economic Analysis, 1992). These proportions are illustrated in Figure 3-8.1.

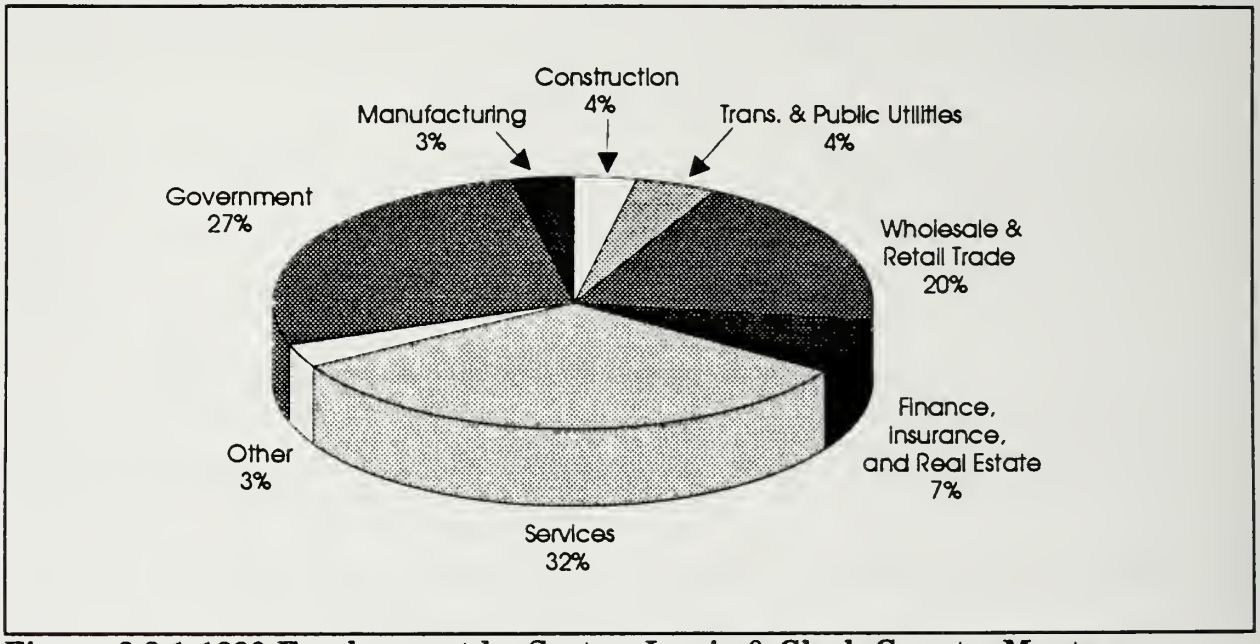

Figure 3.8-1 1990 Employment by Sector, Lewis & Clark County, Montana

Unemployment for Lewis and Clark County averaged 5.4 percent for the first nine months of 1991, while the state average for that period was 6.8 percent, the same as the U.S. average for the same period (U.S. Bureau of Economic Analysis, 1992). However, unemployment had declined for both the county and the state by November of 1993, when the rates were 4.5 and 5.8 percent, respectively (Montana Dept. of Labor and Industry, Research and Analysis Bureau, 1994).

Total personal income (as of 1990) in Lewis and Clark County is $784 million. Annual per capita income (PCI) is approximately $16,460, roughly 94 percent of the United States average PCI and 108 percent of the Montana average (U.S. Bureau of Economic Analysis, 1992).

The construction economy in the Helena area, as estimated by the dollar amount of building permits, increased steadily between 1990 and 1993, from $15.5 million to $26.9 million, an increase of 73 percent.

3-8.2 Population, Housing, and Other Community Services

Lewis and Clark County had a 1990 population of nearly 48,000. Population growth in the county during the 1980s was slightly more than 10 percent, while population in the state as a whole grew by less than 2 percent. By comparison, U.S. population increased by less than 9 percent during the same period (U.S. Bureau of the Census, 1990a).

According to the 1990 Census, there are nearly 20,000 year-round housing units in Lewis and Clark County. Since the 1980 Census, the number of housing units has increased by 12 percent. As of the 1990 Census, approximately 68 percent of the units are owner-occupied. The vacancy rate for owner-occupied homes is quite low, at 2 percent, while the rental unit vacancy rate is 7 percent. These vacancy rates represent more than 600 available housing units (U.S. Bureau of the Census, 1990b).

Because of the small amount of personnel change associated with the proposed action, land use, schools, and government finance will not be addressed in this EA.

3-8.3 Transportation

The Helena Regional Airport is primarily accessed from Interstate 15 via Airport Road (see Figure 3-3.2). The airport can also be accessed from Canyon Ferry Road (north of the airport) via several gravel roads. Both Airport Road and Canyon Ferry Road are paved. Canyon Ferry Road and U.S. Highway 12/287 (south of the airport) provide access between Helena and East Helena. Levels of service on these roads is generally an A (good) with few or no delays in traffic flow. A group of houses is located near Hickman Drive and Canyon Ferry Road and there are scattered residences along Canyon Ferry Road to the north of the airport.

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4 ENVIRONMENTAL CONSEQUENCES

This chapter discusses the potential changes in MT ARNG operations and the types of effects the proposed action or alternatives could cause in various environmental and socioeconomic resource areas. The general methods of analyzing the impacts to resources are introduced at the beginning of each section. Measures to mitigate potential impacts are suggested, and unavoidable adverse environmental effects or potential cumulative effects are discussed.

The concept of "significance" as used in this chapter includes consideration of both the context and the intensity or severity of the impact, as defined by 40 CFR §1508.27. The criteria used to differentiate between significant and insignificant impacts are discussed, with distinctions made (when feasible) between short-term versus long-term impacts.

For this EA, a structured, integrated process was used to identify the possible environmental effects arising from activities associated with implementation of the proposed action or alternatives. The likely major elements of the proposed action were identified, and the major activities associated with these elements were evaluated. Because the no action alternative would not result in any new impacts, the current situation was used as a baseline to compare impacts from new activities that could occur under the proposed action. For each major activity, the types of effects that activities could generate were defined in various environmental resource areas. This process enabled the identification of the effects in one resource area that would be generated by an activity (direct effects), and also by an activity's effects on another resource area (indirect, secondary, or higher order effects).

The significance of an environmental impact depends on several factors, including the following:

- The magnitude—the size of the change in the baseline condition.
- The likelihood—the chance of the change occurring if the action is taken.
- The context—the setting or frame of reference. This has both spatial (geographic) and temporal (timeframe) meanings: the significance of an impact can vary in local vs. regional vs. national vs. global contexts. Similarly, impact significance can be different in the short term vs. the long term.
- The intensity—the severity of an impact (as the term is used by the CEQ at 40 CFR 1508.27). Included in this factor are considerations of the following:

- The severity of adverse effect components within overall impacts that have both beneficial and adverse components.
- The degree of adverse effect on specific resources or concerns (such as public health, endangered species, historic places).
- The potential for violation of laws or regulations.
- The potential of this action as precedent.
- The degree of uncertainty and unknowns.
- The degree of potential controversy.
- The uniqueness of the setting.
- The relation to other actions with potential cumulative (additive) effects.

- The permanence, the reversibility of the impact, and the resilience of the affected resource.

These factors were considered for each resource area and used to formulate significance criteria to serve as guidelines for categorizing the significance of impacts. These criteria, summarized in the "Analysis Methods" section of each resource section, take into account all the relevant significance factors. The estimated environmental impacts of the proposed action and alternatives were evaluated and then compared to the significance criteria to determine the potential significance of the predicted impacts. The results of the impact analysis are presented in the following sections.

4-1 GEOLOGICAL RESOURCES

Impacts to geological resources, including soils, could occur from disturbances caused by construction activities such as excavation, soil compaction, or erosion. Other potential impacts to geological resources could originate from the accidental discharge of petroleum or other contaminants from machinery or storage and transfer facilities.

The results of this analysis indicate that adverse but insignificant impacts to geological resources would result from construction of the proposed AASF. The impacts would be caused by direct physical disturbances, such as site preparation (removal of vegetation, and excavation and stockpiling of all topsoil and organic matter). Indirect but insignificant impacts resulting from soil disturbances (which lead to potential wind and water erosion, and destruction of habitat used by local wildlife) would also occur. Impacts from operations, with mitigation, would be insignificant.

4-1.1 Analysis Methods

The analysis of impacts to geological resources is based on a literature review of existing data and publications for the potentially affected location. The review included an interim soil survey, topographic maps, and two U.S. Geological Survey documents. To determine

potential impacts, the analysis focused on potential adverse changes to baseline conditions of identified geological resources (see Section 3-1), with the significance of an impact based on the following significance criteria.

For this analysis, an impact was determined to be potentially significant if a regional or local resource is depleted, if a major geological hazard were affected, or if a substantial increase in the rate of erosion or a major change in the characteristics of the soil would occur. Adverse impacts would be insignificant if the area of potential impact is slight (not bearing on the relevance, importance, or level of concern for the resource in the affected region). Beneficial impacts would occur if the action offsets a hazard or restores the resource.

4-1.2 Potential Impacts from the Proposed Action

The proposed action could affect the geology of the area, as well as the soils. Short-term impacts would occur during project construction. Long-term operations could also affect geological resources.

4-1.2.1 Potential Impacts from Construction

Geology and Soils

Leveling and excavating the proposed site during construction would have no impact on the geology, unless the site for the detention basin is excavated more than five feet below the current grade. Excavating this site to a depth of more than five feet would have an insignificant impact on the upper sediment layer and could potentially impact a perched aquifer (USGS, 1992) (see Section 4-5).

Approximately 20 acres of ground would be disturbed for the construction of the AASF and pavement. The Montana Pollutant Discharge Elimination System regulations (MCA Title 16, Chapter 20, Section 1314) requires a storm water discharge permit for construction activity when clearing, grading, and excavating will result in the disturbance of more than 5 acres or the disturbance of more than one acre if the activity is located within 100 feet of a surface water body. A Storm Water Erosion Control Plan must be designed and approved by the Water Quality Bureau prior to commencing construction.

As described in Section 3-1.2, the soils on the site of the proposed action are loam and gravelly loam. The site is in a valley with sediment depths exceeding 20 feet. Construction limitations due to soil properties would be minor, with frost action (upward heaving of soil, caused by water in the soil freezing) being the main consideration (USDA, undated).

A detention basin would be excavated near the northeast corner of the site, with a minimum depth of three feet. Currently, the plans specify seeding the bottom of the basin with vegetation; an impermeable liner is not planned (Schlenker, 1994).

The site would be graded to conform to Army standards for helicopter taxiways and aprons. Army Technical Manual 5-803-7 (U.S. Army, 1981) specifies a maximum grade of 1.5 percent for the taxiway and apron. Levelling and grading the site for the taxiway and apron to a grade of 1.5 percent, and then a steeper slope north of the building, dictated by drainage and vehicular traffic, would require about 270,000 cubic yards of fill (Schlenker, 1994). Potential sources of fill include excavated material from the detention basin (if it is excavated below the existing elevation) and from airport property north of the site. Additional fill would be imported from an area of old mine tailings and overburden about 1½ to 2 miles to the west, or overburden from gravel pits located about 2 miles to the east of the site. Depending on the type of ore, mine tailings potentially are contaminated with heavy metals. The metals can be naturally-occurring or residual material from extraction processes. Gold, silver, and copper ores typically contain arsenic, cadmium, lead, zinc, and mercury. Consequently, any mine tailing material proposed for use as fill should be considered for, and if deemed necessary, tested for the presence of contamination before being placed at the MT ARNG site.

Topsoil and subsoils could be subject to erosion in the short-term by grading and excavating during the construction process. Soil would continue to be susceptible to erosion until vegetation is reestablished on disturbed areas or the area is paved. Surface runoff from large or prolonged rainfall events could account for significant erosion from soil stockpiles. Uneven terrain at the proposed site could cause waterborne soil particles from construction activities to move away from the immediate area unless silt traps, mulch, or other erosion control devices are used. Because of the slow growth of vegetation in disturbed areas, an alternative to revegetating would be the use of soil erosion blankets on susceptible areas. Implementing a Storm Water Erosion Control Plan, in accordance with MCA Title 16, Chapter 20, Section 1314, as described above, would result in insignificant impacts to soils.

Topography

The site gently slopes toward the northeast. The site, which currently slopes an average of two percent, would be graded and filled to a grade of 1.5 percent from the taxiway to the AASF building, and then a somewhat steeper slope in the northern portion of the site. The intermittent stream channel cutting across the site would be filled to conform with the 1.5 percent grade. An insignificant impact to topography would be expected.

Seismicity

Structures would be designed in accordance with Army Technical Manual 5-809-10, Seismic Design for Buildings and would be required to meet all of the building codes established for this area, including those designed to minimize loss of life from structural damage during earthquakes. As described in Section 3-1, the proposed AASF site is in an area near the

upper limit for seismic zone 3 and is located on unconsolidated sediments which are more susceptible to the effects of earthquakes than bedrock. Building the AASF and related facilities according to seismic zone 4 standards should be considered. The design should resist minor earthquake ground motion without damage, moderate earthquake ground motion without structural damage (but possibly some nonstructural damage, such as broken windows), and major earthquake ground motion without collapse, but with possible structural and nonstructural damage. Major motion would be equal to the maximum credible event for the area (a Modified Mercalli intensity of VIII or greater (5.5 or higher on the Richter Scale).

Buildings in seismic zone 4 must have movement resistant frames capable of absorbing ground motion energy. These frames (commonly metal brackets or specially designed steel beams or bolts) absorb energy by bending but not stretching, and prevent structural items such as columns from moving or being damaged. Another requirement for seismic zone 4 is for foundation footings interconnected by foundation ties or a structural slab to resist ground motion and settling. Following these design criteria would minimize the risk of significant damage from earthquakes.

4-1.2.2 Potential Impacts from Operation

Any potential contaminants (e.g., fuel spills) escaping the paved area could, because of the moderate to moderately rapid soil permeability, quickly infiltrate soils. Depending on the size of a spill, the perched aquifer could be impacted because of its shallow depth (USGS, 1992). The new detention basin would also collect runoff from most of the site. Contaminants, in sufficient quantities, could be carried with the industrial stormwater runoff to the detention pond, and could contaminate soils and groundwater underlying the detention basin.

The primary potential contaminants are fuels or oils. Fuels are to be stored in the eastern portion of the AASF site, and would be contained in two new 25,000-gallon underground storage tanks (USTs). A new fuel dispensing island would also be installed. Each 25,000-gallon UST would be double-walled and have interstitial leak detection monitoring. Trucks would transport the fuel to a paved area to fuel the helicopters. Any spills would be handled under the Spill Response Plan of the MT ARNG.

Because the tanks are double-walled and monitored, and protected from accidental damage, leaks would be unlikely to reach any soils. Fueling operations are also carefully monitored and spills from tanker trucks would be promptly cleaned under the spill plan. Therefore, impacts would be minimal.

The amount of soil disturbed by rotor wash (wind currents generated by the rotors) is currently not causing any significant erosion at the airport or at training areas. The number of helicopter operations are not expected to increase under the proposed action.

Consequently, the extent of rotor wash which would occur under the proposed action would not be expected to significantly change from existing conditions.

4-1.3 Potential Impacts from the Apache Fielding Alternative

Impacts for construction and operation would be the same as described in Section 4-1.3.

4-1.4 No Action Alternative

If no action was taken, baseline conditions would not change and additional impacts would not be anticipated.

4-1.5 Mitigations

If mine tailing materials are to be used as fill, and are thought to be potentially contaminated with heavy metals, the materials should be tested for the presence of contamination before being placed at the MT ARNG site.

Soil erosion control measures, such as silt traps, mulch, sediment ponds, and reestablishing vegetation, are required under the Montana Pollutant Discharge Elimination System regulations to prevent excessive erosion and siltation of nearby creeks and the irrigation canal. Topsoil could be stockpiled separately from the subsoil to preserve the value of both resources. Soil stockpiles should be covered to prevent wind erosion.

Because the detention basin would likely receive runoff from helicopter aprons and other paved areas, potential soil and groundwater contamination must be prevented. This could be achieved by ensuring that the spill plan is implemented and spills are fully cleaned up. Lining the basin, as a means of preventing contaminants from reaching the underlying soils or groundwater, would also be beneficial in precluding future remediation actions (if a large spill occurred and was not addressed according to the spill plan).

4-1.6 Unavoidable and Cumulative Impacts

Soil disturbance would be unavoidable. However, because the excavation would be occurring in a previously disturbed area (Wilmoth, 1994), this unavoidable impact would be insignificant. As no other construction projects would occur in the same timeframe and vicinity as the AASF, no cumulative impacts have been identified during the construction process. However, during the operational phase, if runoff occurs from other areas, such as the National Guard Armory to the north, the potential for soil and groundwater

contamination would increase. This potential cumulative impact could be avoided by lining the detention basin.

4-2 AIR RESOURCES

Direct air quality impacts would occur as a result of construction (e.g.; filling, grading, paving, traffic) and operational (e.g.; refueling, facility operation, aircraft operation) activity associated with the proposed action. Construction-related impacts would occur intermittently for about one year, while operational impacts would be long-term. Based on the analysis described in this section, air quality impacts during construction would be potentially significant, and operational impacts would be insignificant.

The significance of impacts to air quality is based on federal and state pollution regulations and standards. A significant impact would be a violation of the NAAQS or MAAQS, the further aggravation of an existing air quality violation, or exposure of sensitive receptors to increased pollutant concentrations. Significant rates of emissions for various criteria pollutants are shown in Table 4-2.1. Projects with daily operations-related emissions that exceed the thresholds are considered to be potentially significant. A beneficial impact to air quality would be a reduction in baseline emissions.

Table 4-2.1
Significant Emission Rates for Criteria Pollutants

Pollutant	Emission Rate
Carbon Monoxide	100 tpy[1] (548 lbs/day)
Nitrogen Oxides	40 tpy (219 lbs/day)
Sulfur dioxide	40 tpy (219 lbs/day)
Particulate Matter	25 tpy (137 lbs/day)
Ozone (Volatile Organic Compounds)	40 tpy (219 lbs/day)
PM-10	15 tpy (82 lbs/day)

[1] Tons per Year
Source: State of Montana Air Quality Rules, Dec 92

4-2.1 Analysis Methods

The analysis was based on a review of existing data and publications on the potentially affected area, including state air agency regulations, USEPA air regulations, and monitoring

data. The current baseline air pollutant emissions and sources were determined (see Section 3-2), then the projected changes that would occur as a result of the proposed action and alternatives were assessed with respect to that baseline. The assessed changes were then evaluated against significance criteria to determine the potential adversity of any impact. Climatic conditions and proximity to metropolitan areas and sensitive receptors were considered in the analysis.

Construction equipment emissions factors provided in tables found in California Environmental Quality Act Air Quality Handbook (CEQA, 1992) were utilized. The analysis assumed the majority of construction would occur over one year with most of the dirt moving occurring within a 180-day period. The source, "CEQA, 1992", was used because it provides an up-to-date compilation of construction emission factors drawn from numerous USEPA sources of emission factors.

4-2.2 Potential Impacts from the Proposed Action

The potential to impact air quality may be short-term or long-term. Short-term impacts are associated with construction activity, while long-term impacts correlate with MT ARNG operations after completion of construction activities and the helicopter conversion.

4-2.2.1 Potential Impacts from Construction

Numerous sources of emissions are associated with construction activity. These include construction, heavy duty equipment (trucks, loaders, scrapers, etc.), dust from loading/unloading trucks, trucks traveling on paved and unpaved road, on-site energy use, construction work trips, non-work trips (lunch, errands, etc.), and traffic impacts.

The majority of construction would occur at one location as described in Section 2-5.2. The Army Aviation Support Facility is approximately 124,000 square feet, and paved areas equal about 857,000 square feet. To move the 270,000 cubic yards of required fill (see Section 4-1.2.2), it would take nine trips a day from a site approximately five miles from the construction site for a 150-day period. Ten 20-cubic yard earthmovers would be used.

Potential emissions on a busy day during the peak period of construction were estimated and are shown in Table 4-2.2. This worst-case day would occur during the fill and excavation construction timeframe. The calculated daily emission rates for NOx and PM_{10} would exceed threshhold rates presented in Table 4-2.1 above. Most of the additional emissions could be mitigated by the contractor. Mitigation measures to address these short-term emissions are presented in Section 4-2.5.

Because the predominant wind direction is from the west and not toward any nearby PSD Class I areas (i.e., Gates of the Mountains Wilderness Area), no degradation of air quality to a Class I area would be expected.

4-2.2.2 Potential Impacts from Operation

Potential operational impacts would result from changes to MT ARNG mobile and stationary sources. The proposed action would affect the type of helicopters used and the frequency

Table 4-2.2
Air Pollutant Emission Rates During Construction

Source	Pollutant Emission Rates (pounds per day) Fill and Excavation Period				
	VOC	NO_x	CO	PM_{10}	SO_2
Equipment	36	331	251	27	34
Grading and Filling (PM_{10})	NA	NA	NA	36	NA
Equipment on Paved and Unpaved Roads (PM_{10})	NA	NA	NA	603	NA
TOTAL EMISSIONS	36	331	251	666	34
Significance Criteria	219	219	548	82	219
	Building Erection Period				
New Construction	11	97	32	61*	9
TOTAL EMISSIONS	11	97	32	11	9
Significance Criteria	219	219	548	82	219

NA = Not Available/Not Applicable
* = Includes fugitive dust emission from vehicles on paved and unpaved roads.
Source: State of Montana Air Quality Rules, Dec 92 and CEQA Air Quality Handbook, May 92

of use or flight hours. Additionally, as a result of the proposed AASF construction, the amount of MT ARNG heating space would increase resulting in greater heat plant/boiler emissions. Heat plant emissions (assuming natural gas as a fuel source) would increase by less than one pound per day for all the criteria pollutants except NOx and lead. Emissions of NOx would increase by about four pounds per day. There would be no lead emissions.

According to the Montana Department of Health and Environmental Sciences, Air Quality Bureau (see Appendix A), an air quality permit would be required if the potential emissions

the AASF exceed 25 tons [per year] of a criteria pollutant. If the final design calls for a natural gas heating boiler larger than 40.8 MMBtu/hr, the NOx emissions could exceed 25 tons/year.

Increased electricity consumption associated with the new AASF would cause a negligible increase in offsite emissions if the power is being transferred from a coal-fired plant, and no increase if the power is being generated at hydroelectric plant. Helicopter maintenance operations would change slightly and, consequently, emissions associated with those operations would change negligibly. The aerospace ground equipment (AGE) inventory and use would also remain similar to baseline conditions. As the Black Hawk and Huey helicopters would consume less fuel annually, refueling and fuel storage emissions would decrease with the proposed action. Minimal changes in personnel are anticipated, and pollutant emissions from privately-owned and government-owned vehicles would not change noticeably.

Total project-generated criteria pollutant emissions from helicopter inventory changes and usage at the Helena Airport are compared to baseline rates in Table 4-2.3. The net increase in total criteria pollutant emissions from MT ARNG operations would be approximately six tons per year. The majority of the increase originates from mobile sources (i.e., the Apache and Black Hawk helicopters) in the region and thus would not be expected to result in adverse effects on sensitive receptors. Emissions from mobile sources are generally more geographically and temporally dispersed than those from area or stationary sources. The additive NOx emission increase from the heat plant when added to the NOx increase caused by the change in helicopter operations is not significant. Additionally, all other increases by pollutants are less than significance criteria. Therefore, no significant long-term operational impacts to air quality would occur as a result of the proposed action.

Table 4-2.3 Proposed Action Helicopter Pollutant Emission Rates (tons/year)					
Aircraft Type	**Carbon Monoxide**	**Sulfur Oxides**	**Nitrogen Oxides**	**Hydrocarbons**	**Particulates**
Black Hawk	4.57	1.43	6.69	0.32	N
Huey (UH-1)	12.39	2.24	13.33	10.07	N
Kiowa (OH-58)	15.34	0.59	2.66	3.73	N
Total (tons/year)	32.3	4.26	22.68	14.12	N
Total (pounds/day)	248.46	32.77	174.46	108.62	N
Baseline	250.85	28.54	163.46	136.77	N
Change (lbs/day)	-2.39	4.23	11.0	28.15	N
Change (percent)	-1.0	15.0	6.0	26.0	N
N = Negligible Source: MT ARNG, 1993; U.S. Army, 1993					

Section 176 of the 1990 Amendments to the Clean Air Act require that federal agency activities conform to the applicable State Implementation Plan (SIP) assuring that its activities do not aggravate existing air quality violations or delay attainment status. The MT ARNG at Helena Regional Airport is in an attainment area for all pollutants except lead (and no increase in lead emissions would occur). Additionally, emissions from the proposed action would not exceed the de minimus yearly thresholds finalized by the USEPA at 58 FR 63214 (30 Nov 93) (see 40 CFR 93.153(c)(i). Consequently, a general conformity determination is not applicable or required for the proposed action.

4-2.3 Potential Impacts from the Apache Fielding Alternative

The Apache fielding alternative would have impacts similar to the proposed action to air quality, both in the short-term (during the construction phase) and long-term (following completion of the construction). The impacts to air quality would not be significant as a result of the Apache Fielding Alternative.

4-2.3.1 Potential Impacts from Construction

Impacts from construction of the AASF under the Apache Fielding Alternative would be the same as discussed for the proposed action. Mitigation measures proposed in Section 4-2.5 would apply to this alternative.

4-2.3.2 Potential Impacts from Operation

The Apache fielding alternative would affect the type of helicopters used and the frequency of use or flight hours. The Apache alternative helicopter configuration would result in pollutant emissions generated by 6 Huey, 18 Kiowa, 3 Black Hawk, and 18 Apache helicopters. Additionally, as a result of the proposed AASF construction, the amount of MT ARNG heating space would increase resulting in greater heat plant emissions. The increase in heat plant emissions and off-site power plant emissions would be as described in Section 4-1.2.2.

Helicopter maintenance operations have the potential to decrease because the Apache has been designed as a lower maintenance aircraft than the Cobra. Consequently, emissions associated with maintenance operations could decrease. The aerospace ground equipment inventory and use would change as a result of different Table of Equipment (TOE) requirements for the Apache versus the Cobra. The net change in emissions from the AGE equipment supporting 18 Apaches is expected to change insignificantly from that generated by current AGE equipment supporting the 18 Cobras. As the Apache and Black Hawk configuration of helicopters would consume more fuel annually, VOCs from refueling and fuel storage would increase. Any increase in refueling and fuel storage pollutant emissions would be more than offset by the reduction in similar emissions from flight operations as shown in Table 4-2.4.

Table 4-2.4 Apache Fielding Helicopter Pollutant Emission Rates (tons/year)					
Aircraft Type	**Carbon Monoxide**	**Sulfur Oxides**	**Nitrogen Oxides**	**Hydrocarbons**	**Particulates**
Apache (AH-64)	15.27	4.77	22.36	1.05	N
Black Hawk (UH-60)	2.50	0.78	3.67	0.17	N
Huey (UH-1)	4.43	0.80	4.77	3.61	N
Kiowa (OH-58)	15.34	0.59	2.66	3.73	N
Total (tons/year)	37.54	6.94	33.46	8.56	N
Total (pounds/day)	288.77	53.38	257.38	65.85	N
Baseline	250.85	28.54	163.46	136.77	N
Change (lbs/day)	37.92	24.84	93.93	-70.92	N
Change (percent)	15	87	57	-52	N
N Negligible					
Source: MT ARNG, 1993; U.S. Army, 1993					

According to the Montana Department of Health and Environmental Sciences, Air Quality Bureau (see Appendix A), the addition of two 25,000-gallon fuel storage tanks would add approximately 8.5 tons of VOC emissions per year. If this quantity of VOC emissions, when added to other MT ARNG VOC stationary source emissions, exceeds 25 tons per year, an air quality permit would be required.

Minimal changes in personnel are anticipated with the Apache Fielding Alternative and pollutant emissions from POV and GOV vehicle miles traveled would change negligibly from baseline conditions.

The total Apache Fielding Alternative criteria pollutant emissions from helicopter inventory changes and usage at the Helena Airport are compared to baseline rates in Table 4-2.4. The net increase in total criteria pollutant emissions from MT ARNG operations would be approximately twelve tons per year, or twice the amount calculated for the proposed action. Most of the additional pollutant emissions generated by the Apache and Black Hawk helicopters would be dispersed over training corridors, particularly the one leading to the Twin Bridges training area. Further, because of good horizontal dispersion from westerly winds of 7-8 mph and terrain-induced turbulence over the length of the route, good existing air quality, and an absence of any highly populated urban areas along the route, the additional pollutant emissions would not exceed NAAQS or MAAQS standards at ground level. The impact would be negligible. The additive NOx emission increase from the heat

plant when added to the NOx increase caused by the change in helicopter operations is less than significance criteria. Comparing the increases for each criteria pollutant to significance criteria reveals that significant impacts would not occur in the long-term.

For reasons similar to those discussed in Section 4-1.2.2, a general conformity determination would not be required for the Apache Fielding Alternative.

4-2.4 No Action Alternative

Taking no action would result in similar emissions as currently occurs, with no significant impact to air quality expected in the study area.

4-2.5 Mitigations

The potential for significant adverse effects on air quality from construction generally can be mitigated to a level of insignificance by employing standard mitigation measures. For areas in non-attainment for a pollutant, additional best available mitigation measures should be employed. As the study area is in attainment status for all pollutants, with the exception of lead, only the following standard mitigation measures are proposed.

To reduce fugitive dust from construction, the contractor should apply approved chemical soil stabilizers to all inactive construction areas and replace ground cover in disturbed areas as quickly as possible. Other measures would be to enclose, cover, water twice daily, or apply approved soil binders to exposed stock piles, sand, or dirt.

To reduce fugitive dust from grading, the contractor should water active sites at least twice daily and suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph.

To reduce fugitive dust from roads, the contractor should sweep paved roads at the end of day if any visible soil material exists and apply water twice daily to all unpaved parking or staging areas, and unpaved road surfaces. All equipment should have the soil washed off prior to leaving the site for the day. Traffic speeds on unpaved roads should be limited to 15 mph and haul trucks should be covered and maintain at least six inches of freeboard (minimum required space between the top of the load and top of the trailer).

To minimize NOx emissions, the contractor should use construction equipment that has catalytic converters (for gasoline-powered equipment) and prevent trucks from idling longer than two minutes. All construction vehicles should have required emission control devices in place, and should be properly tuned and maintained.

4-2.6 Unavoidable and Cumulative Impacts

While some of the construction pollutant emissions are avoidable by means of mitigation, other operational emissions such as increased mobile and stationary source emissions are unavoidable. However, for reasons discussed above, the unavoidable adverse impacts to air quality associated with mobile and stationary source emissions of the proposed action and alternative would be insignificant.

No significant cumulative impacts to air quality are likely from the proposed or alternative MT ARNG helicopter conversions.

4-3 NOISE

This section evaluates the significance of the potential change in the noise environment that would result from the proposed action. The impacts are related to the magnitude of the noise levels that would be generated by the construction and the operation of the helicopters, and the proximity of noise-sensitive receptors to the noise source. A noise-sensitive receptor is defined as the occupant of any facility where a state of quietness is a basis for use (e.g., a residence, hospital, or church). Some protected species of wildlife are considered noise-sensitive receptors. Additionally, livestock and poultry are potential noise-sensitive receptors. Livestock can be injured during noise events if they are fenced in an area. Poultry can smother each other as they react to noise events. Noise impact to wildlife and domestic animals are evaluated in Section 4-4.

Noise generated during AASF construction would cause insignificant impacts to receptors. Operating Black Hawk helicopters, which generate less noise than the Cobra helicopters, would result in an insignificant impact. Flying operations under the Apache fielding alternative, with mitigation, would cause insignificant adverse impacts.

4-3.1 Analysis Methods

The information discussed in Section 3.4 provides the basis for determining the impacts to the biological and human environment from noise generated operations. Changes in time-average sound levels of more than 3 dB are usually perceivable to the average person. Increasing exposure to noise levels greater than 75 DNL could be adverse and is usually not mitigable. Increasing exposure to noise levels between 65-75 DNL could also be adverse, but could be mitigated. Exposure of noise-sensitive receptors to levels less than 65 DNL would be an insignificant impact. The perception of noise by people residing in an area as measured in terms of potential annoyance and noise complaints is also considered in determining the adversity of potential impacts.

4-3.2 Potential Impacts from the Proposed Action

Noise generated from construction activities would be a short-term impact, while noise generated from helicopter operations would be a long-term impact.

4-3.2.1 Potential Impacts from Construction

In general, construction activity would not cause significant noise impacts since it would be short-term and normally limited to daytime hours. The proposed construction was described in Section 2.5.

Construction noise emissions from similar type projects at 50 feet from the center of a construction site have been projected at approximately 90 dBA. Sites in flat-lying areas with minimal trees experience construction noise attenuation at a rate of six dBA for each doubling of distance between the source and the receptor. Because the Helena Regional Airport has minimal terrain attenuation, this rate is used as an estimate of potential noise levels at a receptor site. At 1,500 feet from the center of the construction site (i.e., the AASF), the nearest off-base receptor (a residence just north of Canyon Ferry Road) would experience a noise level of about 60 dBA during construction activities. A group of residences about ¾ mile to the northwest (near Hickman Drive and Meagher Road) would experience a noise level of about 50 dBA. These levels would be consistent with a suburban residential area near a small airport and do not represent a significant impact.

4-3.2.2 Potential Impacts from Operation

The Cobra helicopters would be replaced with 16 Huey helicopters and 8 Black Hawk helicopters. The 18 Kiowa helicopters would be retained.

Noise levels associated with operating the Huey, Cobra, and Black Hawk helicopters are presented in Table 4-3.1. The Black Hawk helicopters are generally 3 to 4 decibels quieter than the Cobra helicopters currently operated. Detailed information on the noise generated by Kiowa helicopters was not available. However, noise studies indicate that Kiowa helicopters are quieter than the Black Hawk helicopters (IDARNG, 1993). The DNL contours in the vicinity of the airport would not change because MT ARNG helicopter operations account for only 18 percent of all operations and commercial jet aircraft would continue to dictate the size and shape of these contours.

Table 4-3.1 Helicopter Noise Levels (Flyover) at 1,000 Feet Above Ground Level				
Distance to Side of Path (Feet)	Sound Exposure Levels[1], dBA			
	Huey	Cobra	Black Hawk	Difference (dBA)
0	92	91	87	4
100	92	91	87	4
200	92	91	87	4
300	92	91	87	4
400	92	91	87	4
500	91	90	87	3
600	91	90	86	4
700	91	89	86	3
800	90	89	86	3
900	90	89	86	3
1,000	90	88	86	2

[1] Sound Exposure Levels (SELs) represent the sound level that would result if all of the sound energy of an event occurred during one second. Overflights, which last for about twenty seconds, have SELs several decibels higher than the maximum sound level of the event.
Sources: U.S. Army, 1992; U.S. Air Force, 1989.

Depending on the flight paths taken by the helicopters, the nearest off-base receptor (a residence just north of Canyon Ferry Road would experience SELs of about 89 dBA for the Huey helicopters and about 85 dBA for the Black Hawk helicopters. This would be slightly less than the noise experienced during current operations with Cobra helicopters. The group of residences located about ¾ mile to the northwest of the airport would experience SELs of 50 to 60 dBAs during Black Hawk helicopter overflights, depending upon the routes flown by the helicopters. This would be slightly less than SELs currently experienced, resulting in an insignificant beneficial impact.

With Black Hawk helicopters, residences along the flight paths to training areas would experience noise levels 3 to 4 decibels less than noise levels experienced during overflights with Cobra helicopters. This would represent an insignificant beneficial impact. Noise levels experienced during Huey and Kiowa helicopter overflights would remain the same.

The helicopters would be flown about the same number of hours. The number of after dark operations would decrease as compared to current operations. Consequently, the number of noise related complaints associated with operations between 10:00 p.m. and 7:00 a.m. would be expected to decrease. Because the total hours of operations would not substantially change, the Black Hawk helicopters are quieter than the Cobras to be replaced, the new Hueys would generate similar noise levels as the existing Hueys, and fewer operations would occur at night, an insignificant beneficial impact would occur if the proposed action is implemented.

4-3.3 Potential Impacts from the Apache Fielding Alternative

Noise generated from construction activities would be a short-term impact, while noise generated from helicopter operations would be a long-term impact.

4-3.3.1 Potential Impacts from Construction

The same facilities would be constructed as described under the proposed action, therefore, the impacts would be as discussed in section 4-3.2.1.

4-3.3.2 Potential Impacts from Operation

The Apache and Black Hawk helicopters are quieter than the Huey and Cobra helicopters currently operated by the MT ARNG. As Table 4-3.2 illustrates, the noise levels associated with the flyover (at 1,000 feet elevation) of the proposed helicopters is generally four to seven decibels less than the helicopters currently used.

While flying time would increase as a result of longer flights in the training routes and areas, the number of operations at Helena Regional Airport would be expected to change negligibly as a result of the proposed action. However, the percentage of operations before sunrise and after sunset could increase from the current 20 percent of total operations to about 60 percent of total operations. The time of departure for night flights would vary throughout the year, from around 6 p.m. in the winter to around 9 p.m. in the summer. With an average flight duration of about two hours, most flights would be completed before 10 p.m. The exception would be during the summer when night flights would return around 11 p.m.

The potential reduction in noise levels (SELs) and decreased annoyance associated with the alternative action helicopters would be offset by the increased number of night flights. The potential change in night-time sound levels and subsequent amount of noise annoyance in residential areas would increase with more flights occurring after 10:00 p.m. Background noise levels typically drop from daytime levels (normally around 55 - 60 dBA) and any added sound at night is perceived to be louder than if it were added during daytime hours. This

perception, combined with potential sleep and communication disturbance, results in greater annoyance on the part of receptors. As Table 4-3.2 illustrates, within 1,000 feet of the

Table 4-3.2
Helicopter Noise Levels (Flyover) at 1,000 Feet Above Ground Level

Distance to Side of Path (Feet)	Sound Exposure Levels, dBA					
	Huey	Black Hawk	Difference (dBA)	Cobra	Apache	Difference (dBA)
0	92	87	5	91	85	6
100	92	87	5	91	85	6
200	92	87	5	91	85	6
300	92	87	5	91	85	6
400	92	87	5	91	84	7
500	91	87	4	90	84	6
600	91	86	5	90	84	6
700	91	86	5	89	84	5
800	90	86	4	89	83	6
900	90	86	4	89	83	6
1,000	90	86	4	88	83	5

[1] Sound Exposure Levels (SELs) represent the sound level that would result if all of the sound energy of an event occurred during one second. Overflights, which last for about twenty seconds, have SELs several decibels higher than the maximum sound level of the event.
Source: U.S. Army, 1992

helicopter overflight, SELs would exceed 80 dBA. Noise reduction measures, listed below, should be implemented to avoid potentially significant impacts to residential areas at night (after 10:00 p.m. and before 7:00 a.m.).

4-3.4 No Action Alternative

If no action were taken, baseline conditions would not be impacted. Noise levels experienced by sensitive receptors would remain the same.

4-3.5 Mitigations

For the proposed action, mitigations are not needed as an insignificant beneficial impact would result.

For the Apache Fielding alternative, night-time helicopter flights should be directed at least one-half mile away from residential areas to reduce the potential for noise disturbances. Noise levels for the Apache helicopters attenuate to about 60 dBA at one half mile straight ahead of the flight and 50 dBA one-half mile to the side of the flight. This is below significant levels.

4-3.6 Unavoidable and Cumulative Impacts

A short-term increase in noise levels during construction under the proposed action or Apache fielding alternative and a long-term increase in evening noise levels under the Apache fielding alternative would be unavoidable impacts. With the mitigation discussed above, this unavoidable impact would be insignificant. No other construction activity is anticipated during the same timeframe as the AASF construction. Additionally, the level of aircraft activity operating out of Helena Regional Airport is not expected to change in the foreseeable future as a result of any MT ARNG or outside actions. Consequently, no significant cumulative noise impacts would be anticipated.

4-4 BIOLOGICAL RESOURCES

The principal concerns regarding biological resources include construction impacts on wildlife and their habitat and the potential for low-flying helicopters, specifically the Black Hawks and Apaches, to disturb sensitive populations during calving, migration, or nesting seasons, which could contribute to population declines.

The effects of construction activities would disturb small areas of common grassland and domestic vegetation. These activities would not lead to degradation of important habitat, loss of aquatic resources, or risk the viability of threatened or endangered flora and fauna. Insignificant changes in MT ARNG helicopter ground and flight operations and associated pollutant emissions would result in negligible additional impacts to biological resources.

4-4.1 Analysis Methods

The method of analysis of potential impacts to wildlife includes consultation with Federal and state wildlife agencies that possess the experience, expertise, and authority to predict the significance of potential impacts to vegetation and wildlife. In addition, the analysis

compares existing and proposed air, noise, and water emissions to determine if the change would significantly impact species of concern.

Impacts to biological resources would be significant if the viability of protected plant and animal species was jeopardized, with little likelihood of reestablishment after completion of the proposed action. Significant impacts on surface water ecosystems, including wetland areas, would occur if the proposed project resulted in altered hydrologic flow, drainage of sediment or contaminants into systems with species of concern, or actual filling or destruction of a valued aquatic habitat.

4-4.2 Potential Impacts from the Proposed Action

Potential impacts to biological resources are related to the change caused by the proposed action relative to current conditions and the type of effect that change would invoke. The change may cause either a physical or non-physical disturbance to vegetation, wildlife, or wildlife habitat. A physical disturbance includes disturbing the land or habitat as might occur during construction activities. A non-physical disturbance might include noise or visual intrusions into the ambient environment causing a species to become startled and react adversely. Degraded air quality may cause physical effects on biological resources. An animal could develop physiological responses to pollutants or its habitat could be altered, injured, or stressed by increased pollutant concentrations.

Changes and effects not only associated with construction, but changes in other environmental resource areas have the potential to affect biological resources. The change associated with the Huey and Black Hawk fielding includes construction of a new facility (the AASF), approximately the same amount of flight time along the existing routes and in the existing training areas, lower noise levels (see Section 4-3), and similar air (see Section 4-2) and storm water (see Section 4-5) pollutant emissions.

4-4.2.1 Potential Impacts from Construction

The construction would not impact any species of concern or their habitat. The proposed site for the AASF does not support any of the sensitive plant species discussed in Section 3-4. The construction would likely displace small mammals, rodents, or birds inhabiting the area, but similar habitat is abundant in the vicinity to accommodate this displacement. Consequently, no significant impacts would occur to biological resources as a result of the AASF construction.

Erosion from construction resulting in increased sedimentation and turbidity in water bodies, specifically Prickly Pear Creek, could impact aquatic species in the stream. However, the required Montana Pollutant Discharge Elimination System (MPDES) general permit for storm water discharges associated with construction activity specifies the need for an Erosion

Control Plan. This plan would contain best management practices and erosion control measures to prevent significant adverse degradation of downstream aquatic ecosystems.

4-4.2.2 Potential Impacts from Operation

Following construction AASF, oil water separators and catch basins would be used inside the maintenance hanger to prevent the release of petroleums, oils, and lubricants (POLs), and antifreeze into the biological environment. However, storm water runoff from the helicopter parking apron has the potential to contaminant water with POLs and antifreeze. Any release would increase the potential for effects on aquatic species in Prickly Pear Creek. The Helena Regional Airport Authority is currently developing a storm water management and monitoring plan (required under the Clean Water Act) that would encompass all sources within the airport boundary. This plan and any outfall contaminant reduction measures would prevent significant impacts to downstream species as a result of airport or MT ARNG activities.

As discussed in Section 3-4, many species of concern and habitat areas including several bird rookeries and large mammal wintering areas exist in the study area. These species and habitat areas currently do not experience significant adverse effects from MT ARNG helicopter activities. Because the new Huey and Black Hawk helicopters would utilize currently used routes, training areas, and landing areas, and the Black Hawk helicopters are quieter than existing Cobras, no additional adverse effects would occur to any species of concern or their habitat. The new Hueys would generate similar noise as the existing Hueys. The species of concern would not undergo any additional notable exposure (visual and noise intrusions) to helicopters as their would be no significant increase in helicopter flight time over what currently occurs. Although a larger aircraft, the visual perception of the Black Hawk would not be significantly different to wildlife than the visual perception of the Cobra.

Because air pollutant emissions generated by Huey and Black Hawk ground and flight operations would be similar to those generated by current MT ARNG helicopter operations, no physiological stress to sensitive species would occur as a result of the proposed action. Additionally, no stress or injury currently occurs to habitat in the study area as a result of air pollutant emissions from MT ARNG helicopter operations and no impact would be expected with the Black Hawk and Huey conversion.

The helicopter flight routes would transect bird migration routes and pilots should be alerted to the possibility of bird-aircraft collisions from mid-September to November, and February to mid-April.

Specific consideration was given to identifying potential effects on threatened and endangered species as identified the MTNHP database search for elements recorded as occurring in the

potentially affected areas. The bald eagle, listed as endangered, is the primary species of concern, although other species that are candidates for listing also warrant consideration. As discussed above, noise and visual disturbance from aircraft flying low altitudes may startle wildlife.

Bald eagles follow the Central Flyway migration route for waterfowl. Helicopter flights could cause adverse impacts during the spring and fall migrations and the period of November 15 through March 1, when a greater concentration of wintering bald eagles occur. This is also the period when bird strikes are most likely to occur. Several literary sources discuss potential impacts of aircraft flights on eagles.

The most recent literature reviewed was a progress report on a bald eagle habitat study (Bowerman and Rogers, 1990 as cited in Russell, 1990). The study focused on eagle biology, food habitats, and interactions with humans at an active nest within a major U.S. Army training site. During the 330 hours of observations over twenty-two days, a total of 281 human-eagle interactions were recorded. Of these 281 interactions, 66 percent were directly related to military activity such as jet aircraft, artillery, and helicopters. Only 50 of these 281 interactions caused a response. These responses were: 1) 45 increased awareness, 2) four short flight in area, and 3) one long flight out of area. Of the five flight reactions, two were caused by civilian trucks and three were jet fighter overflights. The long flight out of the area was caused by a four F-4 fighter jet formation overflight. This interaction was questionable, since the adult eagle returned with a northern pike for its two eyas. Fifty-four of the interactions were within 400 meters of the nest. The interactions appeared to have no effect on nest productivity (Russell, 1990).

A 1986 study (Fleischer and Weisburg, 1986 cited in Manci, 1988) on the effects of jet aircraft on the bald eagle determined that eagles reacted to large jets about 11 percent of the time. This reaction varied from a response consisting of turning of the head toward the aircraft (5 percent) to flying from their perch (5 percent). No data on noise levels were provided in this study. However, since the study was in the vicinity of an airport, SELs of 90 to 120 dB are assumed, which are typical of those generated by large jet aircraft at 500 to 1,000 feet (150-300 m) overhead. Overall, jet flights appeared to have a minor effect on bald eagles. Repeated flight from perches and interrupted eagle interactions could have a negative effect on the bald eagles only if aircraft disturbances were frequent over a prolonged period.

Based on studies such as those discussed above, it would appear unlikely that bald eagles in the MT ARNG helicopter routes or training areas would experience significant adverse effects. The eagles would not be expected to abandon specific wintering habitat areas located directly beneath MT ARNG helicopter routes or in the training areas. With existing MT ARNG helicopter operations, no adverse effects on bald eagles are known to have occurred. Consequently, because the amount of change in noise levels and interactions would be negligible with the proposed action, no future adverse effects would be expected.

The mountain plover (a Federal Category 2 species) has been recorded as occurring in the vicinity of Limestone Hills training area. Most birds may initiate a flight response, but begin normal behavior within seconds after a significant noise event (as cited in Manci, 1988). Because the Black Hawk and Huey aircraft would not physically disturb any mountain plover habitat or the species itself, no significant adverse effects to mountain plovers would occur.

Negligible impacts to aquatic environments would occur as a result of the proposed action. Consequently, impacts to the Montana Arctic Grayling (a Federal Category 1 species) would not be expected.

4-4.3 Potential Impacts from the Apache Fielding Alternative

Potential impacts to biological resources from the Apache fielding would be similar to those from the Black Hawk; therefore, the impacts would be the same as in section 4-4.2.

4-4.3.1 Potential Impacts from Construction

The same construction would occur as described under the proposed action; therefore, the impacts would be as discussed in section 4-4.2.1.

4-4.3.2 Potential Impacts from Operation

The Apache and Black Hawk helicopters to be fielded under this alternative are quieter than the Cobra helicopter. Noise levels from the Apache were estimated to be four to seven decibels less than current noise levels which would have a beneficial impact in terms of potential "startle effects" on wildlife species. The species of concern may undergo more exposures (visual and noise intrusions) to helicopters as a result of the increase in helicopter flight time over what currently occurs; however, much of the increase in flight time would occur in route to training areas at elevations (greater than 500 feet) sufficient to prevent significant adverse effects to species.

With the exception of direct impact of helicopter munitions, no significant adverse effects to mountain plovers would occur in the Limestone Hills training area. Mitigation to protect any mountain plovers found to be nesting in the impact area of Limestone Hills training area are discussed in Section 4-4.5 below. Other potential impacts to biological species would be similar to those discussed in Section 4-4.2.2.

4-4.4 No Action Alternative

As stated in Section 2.7.3, implementing no action would entail modifying AH-1S helicopters to AH-1F helicopters. Neither these modifications nor continuation of current 1-189th ATKHB operations would significantly impact biological resources; however, the mitigation measures discussed in Section 4-4.5 below would also apply to the no action alternative.

4-4.5 Mitigations

In the event that helicopters should need to land at areas other than those currently utilized by MT ARNG helicopters, the areas should be surveyed for plant species of concern mentioned in Section 3-4.1 and listed in Appendix B.

In the event mountain plovers are discovered inhabiting or nesting in the Limestone Hills training area, the Montana Department of Fish, Wildlife and Parks should be notified and measures should be taken to prevent direct disturbance of the species so as not to affect its reproductive success.

4-4.6 Unavoidable and Cumulative Impacts

Potentially disturbing or startling wildlife by way of visual intrusion and noise is a current unavoidable potential impact that would continue following the proposed action. Although adverse, this impact is and would continue to be insignificant because it is unlikely that the reproductive success or survival rates of any species is and would be reduced. Additionally, while bird-aircraft strikes are unavoidable, no direct bird-aircraft strikes with sensitive or endangered species have been recorded with the MT ARNG. Available literature on aircraft overflight and noise effects on wildlife provides some evidence of the unlikelihood that the reproductive success or survival rates of some species is or would be reduced. Specifically, one literary review of available literature on aircraft overflight effects on wildlife concluded, "No study showed that any wildlife populations were reduced as a result of low-flying jets or helicopters" (Kroodsma, 1989). Generally, cattle, antelope, deer, and elk show minor reactions and experience negligible effects from helicopter flyovers.

Potential cumulative actions are discussed in Section 2.8. Other potential construction projects would occur within the boundaries of the airport where no sensitive plant or animal species or valuable or limited habitat are known to occur. Storm water pollutant discharges during construction and operation for all facilities would meet the requirements of the operational storm water discharge permit being prepared for facilities within the airport boundary. The other facilities, either individually or cumulatively, would not generate significant air pollutants that would endanger the proliferation of existing plant and animal

species in the area. Thus, no significant cumulative adverse effects are anticipated from the construction and operation of MT ARNG, existing, and new facilities at Helena Regional Airport.

4-5 WATER RESOURCES

Water resources are surface and subsurface resources which are finite but renewable. Impacts to water resources could occur during the construction and operation of the AASF because of physical disturbances or material releases into surface and groundwater. Based on the analysis below, no significant impacts to water resources would occur during the construction. Surface water drainage would be re-routed by the construction action, however, following the Storm Water Erosion Control Plan would prevent any degradation of surface water resources. Groundwater would not be significantly impacted by construction of the new facility. Impacts to groundwater from operation, with mitigation, would be insignificant.

An impact to water resources at the Helena Region Airport would be considered potentially significant if an aquifer, groundwater well, or surface water body is damaged resulting in a measurable change in a user's water supply, or if the quality of water is diminished to the point where it exceeds federal or state maximum contaminant levels (MCLs). An impact would be insignificant if the change in the water quality did not exceed an MCL. Increased recharge or improved water quality are examples of beneficial impacts.

4-5.1 Analysis Methods

The analysis involved evaluating the topography of the site, identifying locations of nearby water resources, referencing state water survey information, and evaluating current available supply versus projected demand. References consulted include prior NEPA documents, publications by the USGS, documents prepared for the airport expansion project, and interviews with battalion personnel.

4-5.2 Potential Impacts from the Proposed Action

This section discusses the potential impacts to surface and groundwater from the construction and operation of the proposed AASF.

4-5.2.1 Potential Impacts from Construction

Groundwater

A total of 857,000 square feet (approximately 20 acres) would be disturbed during the construction period. Excavation for foundations would impact approximately 124,000 square feet of surface area. The reported depth to groundwater for the area generally exceeds 12 feet (USGS, 1986), but perched aquifers have been encountered locally and the depth to groundwater could be less (USGS, 1992; Youmans, 1993). The moderate to high permeability of soil and most of the underlying geology (scattered irregular lenses of clay would not effectively prevent infiltration of water) in the vicinity of the airport would allow moderate to rapid infiltration and filtration by percolation of sediment-laden water. The depth to groundwater would prevent significant impacts to groundwater from the proposed construction.

Construction of pavements and buildings located in vegetated areas would reduce the recharge area for the valley aquifer by less than 0.1 percent, a negligible impact.

Surface Water

The proposed action could alter the surface water hydrology during construction activities and materially impact surface water quality from discharges of sediment. Because of the size of impacted area (approximately 20 acres) a Storm Water Erosion Control Plan would be required to minimize impacts to surface water. A Storm Water Erosion Control Plan must be designed and approved by the Water Quality Bureau prior to construction taking place.

A Montana Pollution Discharge Elimination System (MPDES) general permit for storm water discharges associated with construction activity would be required for the proposed action. Best management practices for erosion control are provided in the Montana Sediment and Erosion Control Manual (Water Quality Bureau, 1993). Following the Storm Water Erosion Control Plan would protect surface water from potentially significant impacts during construction. Some of the measures that would be included in the Plan are discussed in Section 4-5.5 below.

Water Quality

The necessary excavation and grading could potentially impact groundwater and surface water quality with sediment discharges, and increase the total dissolved solid (TDS) levels. However, the low annual rainfall in the area reduces the possibility of significant infiltration occurring. Additionally, the gravel, sand, and silt sediments underlying the area would filter discharged water and reduce the amount of contaminants reaching the groundwater.

4-5.2.2 Potential Impacts From Operation

Groundwater

Potential impacts to groundwater would be possible as a result of contamination from helicopter maintenance materials or fueling operations. Water used for aircraft washing would be processed through an oil/water separator prior to disposal in the sanitary sewer system. The battalion has an active spill response plan designed to handle possible fuel or chemical spills that occur.

Surface Water

The operation of the new AASF would not increase the amount of domestic water required beyond present levels. Domestic water would be supplied to the AASF from the 24-inch water main that crosses the site. The overall battalion strength would not increase by more than a few individuals as a result of the proposed action and the water demand would likely not increase noticeably. The number of aircraft the battalion maintains would increase slightly after the proposed action. The amount of water used for maintenance activities such as washing would remain about the same.

Stormwater runoff from the new structures and parking facilities would be handled by the designed storm drain system. The storm drains would empty into the storm water retention pond located on the proposed site. The pond overflow would drain into an existing drainage way which empties into Prickly Pear Creek. The current design calls for an unlined pond used for multiple functions including storm water retention, evaporation, and infiltration. The pond would act as a collection basin for runoff from the parking apron and, consequently, contaminants associated with industrial stormwater runoff have the potential to contaminate the moderately to highly permeable soils and groundwater through infiltration. Mitigation to this impact is presented in Section 4-5.5.

The Helena Regional Airport is currently preparing a stormwater discharge permit application to cover the entire facility. No significant impacts to surface water bodies are likely during the operation of AASF based on the current design. The design of the structure and parking facilities would control storm flow and route water into the storm drain system.

Wastewater produced in the facility would be handled by a hook-up to the existing sanitary sewer system. Water from the hanger floor and wash bay drains would go through an oil/water separator before entering the sewer system.

Water Quality

The principal surface water contaminants would be generated by the helicopter and vehicle parking facilities. Parking area residues, including motor oils, hydraulic fluids, and anti-freeze, could be flushed into the surface water drainage system. The total amount of pollutants attributable to the parking areas cannot be quantified, but would have some adverse impact on surface water quality. Although not currently part of the AASF design, use of an oil/water separator would reduce the amount of pollutants reaching the outfall point.

Because operation of the AASF would not produce other contaminants that would come in contact with surface water (wastes would be appropriately containerized or treated), the new facility would not significantly affect surface water quality. Any spills of hazardous materials, such as those which could occur during helicopter refueling or maintenance, would be addressed by the Spill Prevention and Response Plan currently in place.

4-5.3 Potential Impacts from the Apache Fielding Alternative

Impacts for construction and operation would be the same as described in Section 4-5.2.

4-5.4 No Action Alternative

Baseline conditions would not change under the no action alternative, and no additional impacts would be anticipated.

4-5.5 Mitigations

Surface construction areas and soil stockpiles should have sediment control measures such as straw bale barriers, silt fences, or temporary sediment traps. Vegetative controls such as temporary seeding or biotechnical slope and surface protection can be used in some situations. Intermittent wetting of soils could also reduce wind erosion. If the Storm Water Erosion Control Plan is followed during construction, impacts to surface water resources would be insignificant.

Because the detention basin would receive runoff from paved areas, potential groundwater contamination must be prevented. This could be achieved by ensuring that the spill plan is implemented and spills are fully cleaned up. Lining the basin, as a means of preventing contaminants from reaching the underlying soils or groundwater, would also be beneficial in precluding future remediation actions (if a large spill occurred and was not addressed according to the spill plan).

4-5.6 Unavoidable and Cumulative Impacts

Other than the loss of a small area of recharge for groundwater and the additional runoff generated from the apron, parking areas and facility structures, no unavoidable impacts have been identified. The proposed activities, being confined to a limited area, would result in insignificant or negligible unavoidable impacts to water resources.

Other construction either currently ongoing or planned are presented in Section 2.8. The construction of Taxiway "F" will be completed prior to the construction of AASF. Timing of construction activities related to the Regional Fire Training Center, the MT ARNG Attack Battalion Armory and the airport fire station are currently unknown. In the event construction of the facilities occur in the same time frame, impacts would be insignificant with implementation of proper erosion control measures.

The cumulative impact of the combined projects would reduce the area available for groundwater recharge. However, as previously indicated, this area would be negligible when compared to the total recharge area of the Helena Valley-Fill Aquifer and the loss would have a minimal adverse impact on groundwater.

Some of the construction projects would require Storm Water Erosion Control Plans to meet MPDES requirements. Compliance with the plans would eliminate any significant impact to surface water resources from construction activities. All of the future facilities construction should be included in the airport's storm water discharge permit application. Future monitoring of storm water at outfall points could provide information to monitor surface water quality.

The cumulative usage of domestic water would have an insignificant impact on available water supplies. The amount of domestic water available through the water treatment plant is adequate.

4-6 CULTURAL RESOURCES

Cultural and archeological resources are limited, nonrenewable resources whose values may be easily diminished by physical disturbances. A significant impact would occur if resources are physically altered or destroyed to the extent that the potential for research, religious or traditional uses, or eligibility for listing on the National Register of Historic Places is affected. A beneficial impact would occur if a resource is discovered or protected.

Impacts to cultural resources at the Helena Airport would be due to excavation, grading, and soil compaction for construction of the AASF. The Cultural Resources Inventory identified the possibility of a buried site to exist on the property and has recommended monitoring of the site during ground disturbing activities by a qualified archaeologist. Monitoring of the

site during ground disturbing activities would reduce the potential for impacts to cultural resources.

4-6.1 Analysis Methods

To determine the potential impacts on the cultural resources, the analysis focused on identifying the location for construction of the AASF in relation to the locations of potential cultural resources in the area, including those identified in a Cultural Resources Inventory (USDA, 1991).

4-6.2 Potential Impacts from the Proposed Action

The construction would affect a 60-acre area of previously disturbed ground at the Helena Airport. There is a potential for impacts to cultural resources from construction activities such as grading, excavation, and compaction. The Cultural Resource Inventory identified an isolated artifact on the property (see Section 3-6.1). This suggests the possibility of a buried site on the property proposed for construction. To avoid impacts to cultural resources, the Cultural Resources Inventory has recommended monitoring of the site during any ground-disturbing activities.

No new airspace or training areas would be required; therefore, impacts to cultural resources on training areas would remain insignificant.

4-6.3 Potential Impacts from the Apache Fielding Alternative

The impacts from construction and operations would be the same as discussed under section 4-6.2.

4-6.4 No Action Alternative

Implementing the no action alternative would not impact cultural resources. Baseline conditions would not change at the Helena Airport or any of the training areas.

4-6.5 Mitigations

Based on the potential of a buried site on the property, the MT ARNG would implement mitigation measures to include archaeological monitoring during any ground-disturbing activities. Construction workers should also be informed of the potential for cultural resources, describing what a site might look like, and the necessity to stop work and contact

the base cultural resources section and the State Historic Preservation Office to examine a discovered potential site prior to continuing construction activities. With implementation of the above mitigation measures, impacts to cultural resources would not be considered significant.

4-6.6 Unavoidable and Cumulative Impacts

The possibility of affecting previously unknown or undisturbed resources would be an unavoidable impact. No cumulative impacts have been identified. Because of a constantly changing environment in the MT ARNG, the use of Fort Benjamin Harrison is a possibility. An archeological study was prepared to accommodate future development at Fort Benjamin Harrison in a separate study.

4-7 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

The proposed action would have a negligible impact on hazardous materials and waste management. The Apache fielding alternative would have a negligible beneficial impact on hazardous waste and materials management. An impact would be significant if quantities of hazardous waste generated by the proposed action were to exceed regulatory limits or existing disposal capabilities or if workers or the general public were exposed to hazardous materials or wastes above health criteria levels. A beneficial impact would occur if hazardous material or waste quantities are reduced or eliminated.

4-7.1 Analysis Methods

To assess potential impacts, the analysis focused on issues relating to hazardous materials handling and hazardous waste generation. Information on the total amount of hazardous waste generated for fiscal year 1992 was used to establish a baseline upon which the impact of the proposed action and alternatives could be compared. Sources of information included site inspections, personal communications with MT ARNG personnel, hazardous materials and waste documents, and state and federal laws and regulations.

4-7.2 Potential Impacts from the Proposed Action

Hueys would be flown for about the same number of hours, and would require about the same maintenance, as the current Cobra helicopters (McCarter, 1994a). The Black Hawk helicopter was designed to be a low maintenance helicopter, which should result less hazardous waste generation than existing helicopters produce. Therefore, a negligible impact to the hazardous material and waste management programs should occur with the proposed action.

Under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 (42 U.S. Code 11001 et seq), an assessment has been conducted by the Montana Department of Military Affairs Environmental Office for the purpose of determining reporting requirements. The assessment yielded the following results:

- No extremely hazardous substances were found in storage or in use at the AASF.
- Only the fuels stored on site are subject to the reporting requirements of EPCRA Sections 311 and 312.
- The State Emergency Response Commission and the Local Emergency Planning Committee have been notified under Section 311.
- A Section 312 Report is being prepared for submission to the appropriate authorities for a maximum on-site storage of 40,000 gallons (258,960 pounds) of JP-4 and 2,000 gallons (14,542 pounds) of Fuel Oil Number 2.
- Calculations for releases (disposal, emissions, etc.) indicate that the thresholds for Toxic Release Inventory Reporting (Section 313) are not triggered.

Annual records of purchases and inventories are maintained to assure continued compliance with all EPCRA requirements (McCarter, 1994b).

4-7.3 Potential Impacts from the Apache Fielding Alternative

Flying time would increase as a result of longer flights in the training routes and areas. This could increase the amount of hazardous waste generated. However, the Apache was designed to be a low maintenance helicopter which should produce less hazardous waste than existing helicopters. Other sources of hazardous waste generation would be the same as discussed in Section 4-7.2. Therefore, a negligible impact to the hazardous material and waste management programs would occur with this alternative.

4-7.4 No Action Alternative

Existing operations would continue with no impact to hazardous waste management if the no action alternative was implemented.

4-7.5 Mitigations

Since negligible beneficial impacts to hazardous material or waste management programs were identified, no mitigation measures are proposed.

4-7.6 Unavoidable and Cumulative Impacts

Generation of hazardous waste from helicopter operations and maintenance would be unavoidable under the proposed action and alternative. A decrease in the total amount of waste generated at the AASF is anticipated for this year. Any cumulative impact which would occur from the proposed action or alternative is expected to be negligible.

4-8 SOCIOECONOMICS

Socioeconomic resources include elements such as employment, income, population and traffic, that are considered within a specific region of influence (ROI). As a result of the proposed action, impacts to socioeconomic resources in the ROI (Lewis and Clark County) are expected to be negligible, except for a short-term beneficial impact to the local economy that would result from construction expenditures. Transportation impacts would be insignificant. Impacts from the Apache Fielding Alternative would be similar to those occurring under the proposed action.

4-8.1 Analysis Methods

Measures used for impact analysis include employment, income, building permit values, population, and housing. Lewis and Clark County, Montana, and United States employment and income data were obtained from the U.S. Bureau of Economic Analysis and the Montana Department of Labor and Industry, Research and Analysis Bureau. Rational threshold values for Lewis and Clark County were obtained from the US Army Corps of Engineers Construction Engineering Research Laboratory (CERL) on-line database and the Economic Impact Forecasting System (EIFS). Population and housing data were obtained from the 1970, 1980 and 1990 U.S. Censuses. Information on the construction associated with the proposed action was obtained from the Montana National Guard. Building permit value data for the city of Helena were obtained from the City of Helena Building Department. The amount and sources of fill required for construction, and the methods of transport, were obtained through interviews with the design engineers for the proposed action.

Significance criteria are determined by analyzing long-term fluctuation in elements, such as employment and income, within the ROI. This analysis uses ROI-specific levels, or thresholds, for each element. Changes beyond threshold levels result in significant impacts to individuals or communities. These thresholds of significance are called rational threshold values (RTVs). The employment RTVs for Lewis and Clark County are 4.7 percent and -2.7 percent; income RTVs are 4.9 and -2.9 percent. For example, a significant impact would be an annual increase in employment of more than 4.7 percent. A negligible impact would be less than 4.7 percent.

4-8.2 Potential Impacts from the Proposed Action

Potential socioeconomic impacts associated with the proposed AASF construction and operation are discussed in the section below.

4-8.2.1 Potential Impacts from Construction

Employment and Income

Construction labor shortages are not anticipated, as workers could commute from nearby towns and cities. Local retailers may experience small beneficial impacts, as construction workers commuting into the area may shop at local stores and restaurants.

The construction expenditure for the proposed action is approximately $10 million. For the purposes of this analysis, it is assumed that this expenditure will be spread evenly over a three-year construction period, averaging approximately $3.3 million per year. These annual amounts constitute an increase of about 12 percent over the dollar value of the 1993 permitted building construction for Lewis and Clark County, and would represent a beneficial impact to the local and regional construction economy.

Population, Housing, and Other Community Services

Because there are adequate numbers of construction workers within commuting distance, it is unlikely that noticeable numbers of these workers would relocate to the Helena area during the construction period. Therefore, no impacts to population, housing, or other community services are expected from the construction phase of the proposed action.

Transportation

A considerable amount of fill (approximately 270,000 cubic yards) would be required. Some of this fill could be obtained on-site from excavation of a detention basin, but the majority of the required fill would be obtained from gravel pits about 2 miles to the east of the site or

from an area of old mine tailings and overburden about 1½ to 2 miles to the west. Canyon Ferry Road would serve as the main route between the borrow areas and construction site. Load King trucks (with a capacity of 17 cubic yards) or bottom-loading trucks (with a capacity of about 20 cubic yards) would be used to move fill from borrow areas to the construction site. Based on an average of 20 cubic yards per load, about 13,500 total trips would be required. Because of the time required to fill and subsequently unload the trucks, only a few trucks would be on the road at any given time. This would have an insignificant impact on the level of service of Canyon Ferry Road and adjacent gravel roads.

An empty Load King weighs about six tons. Using a soil weight of 2,700 pounds per cubic yard, a full Load King would weigh about 29 tons (approximately 14,500 pounds per axle). If the weight limit were exceeded, damage to the roads would likely occur because of the number of trips required to move the fill.

4-8.2.2 Potential Impacts from Operations

Employment and Income

As a result of the proposed action, an estimated 20 drill (part-time) personnel authorizations would be added to the battalion, while virtually no change in full-time personnel is expected. Because the battalion presently has a higher number of assigned drill personnel than authorizations, it is unlikely that new employment would result from the proposed action. Therefore, no impact to local employment is expected.

Population, Housing, and Other Community Services

Population changes in the Helena area are not expected to occur as a result of the proposed action, since virtually no new employment will be created. Therefore, no impacts to population, housing, or community services are expected from the operations phase of the proposed action.

Transportation

The number of personnel associated with the MT ARNG would not change under the proposed action. Therefore, impacts to transportation would not be expected.

4-8.3 Potential Impact from the Apache Fielding Alternative

Impacts from this alternative would be similar to those described in Section 4-8.2.

4-8.4 No Action Alternative

There would be no socioeconomic impacts from the no action alternative, since no construction activity would occur, and no construction dollars would be expended in the local community.

4-8.5 Mitigations

No significant adverse impacts to socioeconomic resources are expected. Therefore, no mitigations are required.

4-8.6 Unavoidable and Cumulative Impacts

No unavoidable impacts are anticipated. Other projects that could occur during the same timeframe as the proposed action would also require construction workers. These workers would be derived from the local labor force, or would commute from nearby towns and cities. Unless there were other very large construction projects in the ROI or nearby areas, no significant cumulative impacts to the construction economy are anticipated.

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CHAPTER 5
BIBLIOGRAPHY

5 BIBLIOGRAPHY

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CHAPTER 6
PREPARERS

6 LIST OF PREPARERS

This Environmental Assessment has been prepared by the Montana Army National Guard with contractual assistance from LABAT-ANDERSON Incorporated. The following LABAT-ANDERSON staff members were involved in the preparation of this report:

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APPENDIX A
CORRESPONDENCE

IICEP ADDRESSEE LIST

Dept. of Agriculture
Environmental Management Division
Agriculture and Livestock Building
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P.O. Box 200201
Helena, Montana 59620-0201

Dept. of Natural Resources & Conservation
Mr. Art Compton
1520 East 6th Avenue
Helena, Montana 59620-2301

Montana Dept. of Fish, Wildlife & Parks
1420 East 6th Avenue
Helena, Montana 59620

Dept. of Health & Environmental Sciences
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Air Quality Division
Cogswell Building
Helena, Montana 59620

Dept. of Health & Environmental Sciences
Frederick C. Shewman, PhD
Water Quality Division
Cogswell Building, Room A206
Helena, Montana 59620

Helena Regional Airport
Airport Authority
2850 Skyway Drive
Helena, Montana 59601

State Historic Preservation Officer
Mr. Stan Wilmoth
P.O. Box 201202
Helena, Montana 59620-1202

Environmental Protection Agency
Region 8
999 - 18th Street
Denver, Colorado 80202-2405

U.S. Fish & Wildlife Service
Region 6, Denver Regional Office
P.O. Box 25486
Denver, Colorado 80225

Bureau of Land Management
Granite Tower Building
222 N. 32nd Street
Billings, Montana 59101

Bureau of Land Management
Headwaters Resource Area
106 North Parkmont
P.O. Box 3388
Butte, Montana 59702-3388

SCOPING LETTER

The original scoping letter mailed out for agency coordination and input solicited comments on the proposal to convert from the Cobra to the Apache helicopter. Over the duration of the planning and decision-making process the proposal changed from fielding Apaches to converting to a Huey and Black Hawk configuration. Thus, as presented in this EA, the proposed action became the proposal to convert to Huey and Black Hawks and as an alternative, the Apache fielding is being proposed. Because the Apache fielding proposal is similar in terms of generating potential concerns and issues with regard to environmental resource areas as the proposed Black Hawk and Huey conversion, a second scoping letter for the proposed action as discussed in this EA was not resubmitted to outside agencies.

DEPARTMENT OF MILITARY AFFAIRS

MARC RACICOT, GOVERNOR

P.O. BOX 4789

STATE OF MONTANA

OFFICE OF THE ADJUTANT GENERAL
(406) 444-6910

HELENA MONTANA 59604-4789

January 4, 1993

Dear Sir/Madam:

The Montana Army National Guard (MT ARNG) is proposing to convert from the AH-1 "Cobra" helicopter to the AH-64 "Apache" helicopter. Three UH-60 Blackhawks would also be added to the MT ARNG inventory as part of the conversion. In support of this conversion a new Army Aviation Support Facility is proposed for construction at the Helena Regional Airport. According to the National Environmental Policy Act (NEPA) and the Montana Environmental Policy Act (MEPA), the MT ARNG must assess the potential environmental impacts of the proposed action and alternatives. The MT ARNG has contracted LABAT-ANDERSON Incorporated to prepare an environmental assessment to analyze any potential impacts from the proposed helicopter conversion and associated new construction.

In accordance with Executive Order 12372, Intergovernmental Review of Federal Programs, the MT ARNG is requesting input from other federal, state, and local agencies on the proposal. A Description of the Proposed Action and Alternatives is attached for your review and comment. Please identify any resources within your purview that may be potentially impacted. Maps and drawings with project information are also attached to assist your office in reviewing the proposal.

Please provide any comments or information within 30 days of receipt of this letter. Responses may be sent to:

LABAT-ANDERSON Incorporated
Attn: MT ARNG Team
1406 Fort Crook Road, South Suite 101
Bellevue, Nebraska 68005

Your assistance in providing information is greatly appreciated. Questions may be directed to Clif Youmans of the MT ARNG at (406) 444-7974, or to Mike Fisher or Sheri Rivera of LABAT-ANDERSON at (402) 291-2362.

Sincerely,

John B. Wheeler
Environmental Program Manager
Department of Military Affairs

Attachments

SCOPING REPLIES

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
WATER QUALITY BUREAU

COGSWELL BUILDING
1400 BROADWAY

STATE OF MONTANA

FAX (406) 444-1374
Phone (406) 444-2406

PO BOX 200901
HELENA, MONTANA 59620-0901

January 7, 1994

LABAT-ANDERSON Inc.
Attn: MT ARNG Team
1406 Fort Crook Road, South Suite 101
Bellevue, Nebraska 68005

Re: Cobra (AH-1) Helicopter Conversion Project Located at the Helena Regional Airport

Dear Sirs:

The Department of Health and Environmental Sciences (DHES) Water Quality Bureau has reviewed the information submitted to our office on January 5th concerning the above referenced project. My calculations indicated that 19.7 acres will be disturbed during the construction of this proposal. Therefore, coverage under the General Discharge Permit for Storm Water Associated with Construction Activity is required.

In order to obtain coverage under the general permit a signed state application form and an Erosion Control Plan (ECP) must be submitted to the Department a minimum of 30 days prior to construction taking place. Please find enclosed an application form and ECP form for your use.

Once construction of this project is completed, coverage under the general permit for construction activity can be terminated. Activities such as aircraft maintenance, aircraft fueling, washing of aircraft and aircraft deicing will need to be addressed in the Storm Water Pollution Prevention Plan (SWPPP) for the Helena Regional Airport once operation begins.

Feel free to contact me at 444-2406 between 11:00 a.m. and 4:00 p.m. daily should you have questions or concerns.

Sincerely,

R Roxann Lincoln

Roxann Lincoln CPSS
MPDES Storm Water Coordinator

c: Clif Youmans, MT ARNG
Helena Regional Airport Authority

TRL.413

FOR AGENCY USE

APPLICATION NUMBER									

DATE RECEIVED		
YEAR	MONTH	DAY

MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM APPLICATION FOR A GENERAL PERMIT TO DISCHARGE STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY

Return to: Water Quality Bureau - A206 Cogswell Building
Montana Department of Health and Environmental Sciences
Helena, MT 59620

Please print or type:

1. Name and Address of Contractor:

_____
_____
_____

2. Construction Site Address and Name of Owner/Operator (If project is owned by MDOT, please indicate the project number and designation) :

_____
_____
_____

3. Contact Person: _____
Telephone Number: _____

4. Describe the nature of the construction activity: _____

_____
_____
_____
_____
_____
_____
_____

5. Indicate the total area (acres) of the site and the area that will undergo excavation or soil disturbance during the lifespan of the project: _____

_____
_____
_____
_____
_____
_____
_____
_____
_____

6. Site Location (Township, Range, Section, 1/4 Section): _____
Please attach a site map and a drainage or topographic map of the construction location.

7. Describe the planned best management practices (BMPs) to be used during construction to control sediment and erosion in storm runoff: (A detailed Erosion Control Plan is required prior to construction.) _____

DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES
CONSTRUCTION STORM WATER EROSION CONTROL PLAN

A. Site Description

1. Project Name:

2. Project Address:

Township, Range, Section, 1/4 Section:

3. Owner and Contractor Name and address:

4. Project Description, start date and compeletion date (purpose of project and types of soil disturbing activities):

5. Name of the nearest surface water body and distance to (stream, river, wetland, lake, intermittent stream, ephemeral drainages, etc):

B. Controls

1. Temporary Stabilization Practices:
_____temporary seeding _____mulching _____silt fences
_____erosion control blankets _____straw bale dikes
_____temporary drain diversion _____temporary sediment
_____brush barriers basins

Other practices:

2. Permanent Stabilization Practices:
Provide the runoff coefficient if diversion structures and/or detention structures will be used.

_____permanent seeding _____sod stabilization _____check dams _____vegetative buffer strips _____g r a s s e d waterways _____erosion control blankets _____drainage swales _____earth dikes _____pipe slope drain
_____level spreader _____subsurface drain
_____sediment traps _____drain inlet protection
_____sediment basin/pond _____rock outlet protection

C. continued

D. Spill Prevention and Materials Storage Practices

1. Materials Inventory - check those materials which will be present at the site during construction:

_____Concrete	_____Detergents	_____Fertilizers
_____Pesticides	_____Paints	_____Fuel
_____Solvents	_____Metal Studs	_____Lumber
_____Masonry Blocks		_____Tar
_____Petroleum Based Products		_____Roofing Shingles

List any other materials to be used or stored on-site:_____
_____
_____
_____
_____
_____
_____

2. The following product specific storage practices will be followed on-site:

Petroleum and Paint Products:

Fertilizers and Pesticides:

Hazardous Materials:

Concrete Truck Wastewater Disposal:

3. In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and clean-up:

OWNER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ _____

Owner Date

CONTRACTOR CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of the general Montana Pollutant Discharge Elimination System (MPDES) permit that authorizes the storm water discharges associated with construction activity from the construction site identified as part of this certification. Further, by my signature, I understand that I am becoming a co-permittee, along with the owner(s) and other contractors and subcontractors signing such certifications, to the general MPDES permit for the storm water discharges associated with construction activity from the identified site. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act, to ensure compliance with the terms and conditions of the storm water erosion control plan developed under the MPDES permit and the terms of the MPDES permit.

_____ _____

Contractor Date

_____

Responsible For

_____ _____

Contractor Date

_____

Responsible For

State Historic Preservation Office

Montana Historical Society

1410 8th Avenue • PO Box 201202 • Helena, MT 59620-1202 • (406) 444-7715

January 11, 1994

LABAT-ANDERSON Incorporated
Attn: MT ARNG Team
1406 Fort Crook Rd. South, Ste. 101
Bellevue, NE 68005

Re: MT ARNG Army Aviation Support Facility: T10N/R03W/S.22; LC Co.

Dear Sir/Madam:

A cultural resource file search has been conducted for the above cited project location. No sites are currently recorded in the search area. Given the magnitude of previous disturbance in the area and the results of previous survey, there appears to be a low likelihood for encountering heritage properties.

Thank you for consulting with us.

Sincerely,

Stan Wilmoth

Stan Wilmoth, Ph.D.
Archaeologist

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
AIR QUALITY BUREAU

COGSWELL BUILDING
1400 BROADWAY

STATE OF MONTANA

(406) 444-3454
FAX (406) 444-1374

PO BOX 200901
HELENA, MONTANA 59620-0901

January 12, 1994

LABAT-ANDERSON Incorporated
Attn: MT ARNG Team
1406 Fort Crook Road, South Suite 101
Bellevue, Nebraska 68005

Dear Sir/Madam:

The Montana Department of Health and Environmental Sciences Air Quality Bureau (AQB) received the Montana Army National Guard's (MT ARNG) proposal to construct a new Army Aviation Support Facility (AASF) to support the new Apache Fielding. The proposal requested input from state agencies that may have comments. This letter is a response to that request.

The AQB requires an air quality permit if the potential emissions from a site exceed 25 tons of a criteria pollutant (e.g., NOx, CO, VOC, PM10, SO_2). The only apparent air pollutant sources that may force the new AASF to require a permit from the AQB are the heating boiler, fuel storage tanks, and the building housing any helicopters.

If the final design calls for a natural gas heating boiler larger than 40.8 MMBtu/hr, the NOx emissions could exceed 25 tons/yr. I used emission factors from AIRS Facility Subsystem Source Classification Code 1-02-006-02 and assumed the boiler installed would be a natural gas industrial boiler in the 10-100 MMBtu/hr range.

I calculated emissions from the two proposed 25,000 gal fuel tanks using AP-42 Chapter 12 emission factors for storing volatile organic liquids. I assumed the tank to be a flat fixed roof type with a diameter of 18 ft and 16 ft high and storing JP4 jet fuel (JP4 appears to be more volatile than JP8). I calculated an emission rate of about 8.5 tons VOC/yr from the tanks. Please note, potential from the site would include existing sources (e.g., tanks, heaters) as well as proposed new sources. I evaluated the proposal based on the proposed new sources, not in addition to existing sources.

I doubt the buildings housing any helicopters will increase the potential of the site. If there would be a reason to idle any engines while inside the building for any great length of time, then the building could be considered a source of probably NOx and CO.

Based on the review of the boiler and fuel farm, the AQB has determined that the proposed AASF expansion would not need an air quality permit and there would be minimal impact on air quality based on the information provided. Since there were no specifics on sizes, thruput, etc., I could only outline issues to be aware of. If final designs or operations change significantly from the proposal, the MT ARNG should contact the AQB before construction. If there are any questions, please contact me.

Sincerely,

Daniel J. O'Leary, E.I.T.
Environmental Engineer

DO:tjl

APPENDIX B
POTENTIALLY AFFECTED PLANT AND ANIMAL SPECIES

MONTANA NATURAL HERITAGE PROGRAM

1515 East Sixth Avenue
P.O. Box 201800
Helena, Montana 59620-1800
(406) 444-3009

October 12, 1993

Mr. Mike Fisher
Labat-Anderson, Inc.
Omaha Office
1406 Fort Crook Road South
Bellevue, Nebraska 68005

Dear Mr Fisher,

This is in response to your request for information on sensitive species in various areas in southwest Montana. I have checked our database for locations of sensitive species near the helicopter flight paths and training areas indicated in the maps you provided. Enclosed are 5 summary reports which provide location and status information for sensitive species for the following areas: Sieben Training Area, Fort Harrison Training Area and Helena Area, Flight Path South of Helena, Twin Bridges Training Area, and the Limestone Hills and Lone Mountain Training Areas and Flight Paths. The boundaries of each area are indicated on the reports, and on your maps which are enclosed. The information on these reports is arranged by township and range. An explanatory sheet is enclosed which describes the information contained in this report. I have also included a list of vertebrate species known or suspected to occur in these areas.

Please note that the flight paths and landing areas for the Limestone Hills Training Area are very close to several bird rookeries, including 2 for sensitive species (American white pelican and Caspian tern). These rookeries are sensitive to disturbance and represent high concentrations of nesting birds which are rare in the state. We also have an unprocessed element occurrence for mountain plover in this area (from the 1993 field season) which is not yet entered into the database.

In addition, there is an unprocessed botany record from the 1993 field season in the Limestone Hills training area for Townsendia spathulata. This species occupies flat unquarried ridgetops and is susceptible to disturbance. There is another unprocessed record for Astragalus convallarius in the Fort Harrison/Helena area. If you will resubmit your request in late winter, I can provide you with element occurrence information for these three

unprocessed records. If you need information on these occurrences before then, please call.

Please remember that the results of a data search by the Montana Natural Heritage Program are not intended as a final statement on sensitive species within a given area, or as a substitute for on-site surveys needed for environmental assessments. In addition, some of the plant community records we track represent communities which are widespread in Montana. We include certain locations as sensitive records, however, because they represent exemplary, relatively pristine examples of certain community types, or because they have been established as study plots.

Please note that this report includes data intended for use within your firm and not for general distribution or publication. In particular, public release of specific location information may jeopardize the welfare of a threatened, endangered, or sensitive species or community. Specific locations of federally-listed threatened or endangered species should be requested directly through the U.S. Fish and Wildlife Service Office.

We are required to send you an invoice you for these services, which will arrive under separate cover. Please note, the fee can be waived if work is performed for a federal agency, State of Montana agency, or non-profit organization. When the invoice arrives, present it to the contracting agency and have them return it to the Montana Natural Heritage Program along with a note stating they have not been charged by you for the services provided by the Heritage Program. We will then cancel the fee.

I hope this information is helpful to you. Please call if you have questions or need additional information.

Sincerely,

Cory Craig
Assistant Data Manager

MONTANA NATURAL HERITAGE PROGRAM

1515 East Sixth Avenue
P.O. Box 201800
Helena, Montana 59620-1800
(406) 444-3009

EXPLANATION OF SUMMARY ELEMENT OCCURRENCE REPORTS

Since 1985, The Montana Natural Heritage Program (MTNHP) has been compiling and maintaining an inventory of the elements of biological diversity in Montana. The inventory includes plant species, animal species, and plant communities that are rare, endemic, disjunct, threatened, or endangered throughout their range in Montana, vulnerable to extirpation from Montana, or in need of further research.

Individual species and communities are referred to as "elements." An "element occurrence" (EO) generally falls in one of the following categories:

1. Plants - A documented location of a plant population. In some instances, adjacent, spatially separated clusters are considered subpopulations, and are grouped as one occurrence (e.g., the subpopulations occur in ecologically similar habitats, and are within approximately one air mile of one another).

2. Animals With Limited Mobility (most invertebrates, amphibians, reptiles, small mammals, and most fish) - The location of a specimen collection or a verified sighting; assumed to represent a breeding population. Additional collections and/or sightings are appended to the initial EO.

3. Mobile/Migratory Animals (most birds and larger mammals, some fish) - Breeding areas (including nesting territories, dens, and leks) and significant aggregation sites (winter feeding areas, staging grounds, or hibernacula).

4. Communities - All contiguous, high quality habitat as defined by physical and biological features.

5. Other - Significant biological features not included in the above categories, such as state champion trees, or bogs, fens, and other wetlands.

The quantity and quality of data contained in Heritage reports is dependent on the research and observations of many individuals and organizations.

Heritage reports summarize information known to the Program at the time of a request. They are not intended as a final statement on the elements or areas being considered, or as a substitute for on-site surveys required for environmental assessments.

* * *

The Nature Conservancy and Montana State Library

Certain codes and abbreviations are used in element occurrence reports. Although most of these are very straightforward, the following field-by-field explanation should answer most questions.

Name: Plant and animal scientific names consisting of genus and species, with subspecific or varietal names if applicable. Plant associations and community types that existed in the pre-settlement landscape of Montana are named using the scientific names of dominant overstory and understory species.

Common name: Common name of species or community, often as given in regional floras and field guides.

Global rank and State rank: Elements are evaluated and ranked by the Heritage Program on the basis of their global (range-wide) status, and their state-wide status. These ranks are used to determine protection and data collection priorities, and are revised as new information becomes available.

A scale of 1 (critically imperiled) to 5 (demonstrably secure) is used for these ranks, and each species is assigned the appropriate combination of global and state ranks.

Example: common loon = G5 / S3 (i.e., species is demonstrably secure globally; in Montana is found within a restricted range).

Global and state ranks are assigned according to a standardized procedure used by all Natural Heritage Programs, and are defined below.

Global/State Rank		Definition (G = Range-wide; S = Montana)
G1	S1	Critically imperiled because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction.
G2	S2	Imperiled because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range.
G3	S3	Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 to 100 occurrences.
G4	S4	Apparently secure, though it may be quite rare in parts of its range, especially at the periphery.
G5	S5	Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.
GU	SU	Possibly in peril, but status uncertain; more information needed.

GH	SH	Historically known; may be rediscovered.
GX	SX	Believed to be extinct; historical records only, continue search.

Other codes:

A	Accidental in the state; including species (usually birds or butterflies) recorded very infrequently, hundreds or thousands of miles outside their usual range.
B	A state rank modifier indicating breeding status for a migratory species.
E	An exotic established in the state; may be native in nearby regions.
N	A state rank modifier indicating non-breeding status for a migratory species.
Q	Taxonomic questions or problems involved, more information needed; appended to the global rank.
R	Reported in the state; but lacking documentation which would provide a basis for either accepting or rejecting the report.
T	Rank for a subspecific taxon (subspecies or variety); appended to the global rank for the full species.
Z	Ranking not applicable.

USF&WS (USESA) Status: The symbols in this column denote the categories defined in the U.S. Fish and Wildlife Service Notices of Review (1980, 1983, 1985, 1990), and indicate the status of a taxon with respect to the federal Endangered Species Act of 1973:

LE	Endangered
LT	Threatened
P	Proposed E or T
C1	Notice of Review, Category 1 (substantial biological information on file to support the appropriateness of proposing to list as endangered or threatened).
C2	Notice of Review, Category 2 (current information indicates that proposing to list as endangered or threatened is possibly appropriate, but substantial biological information is not on file to support an immediate ruling).
C2*	Category 2, and the taxon is possibly extinct.
3A	Taxa for which the USFWS has persuasive evidence of

extinction.

3B Names that, on the basis of current taxonomic understanding, do not represent taxa meeting the Endangered Species Act's definition of "species."

3C Taxa that have proven to be more abundant or widespread than was previously believed, and/or those that are not subject to any identifiable threat.

NL Not listed/no designation. (See note below.)

Note: A species can have more than one federal designation if the species' status varies within its range. In these instances the Montana designation is listed first.

Examples: bald eagle = LELT. Species is Listed Endangered in Montana; elsewhere in its range it may be Listed Threatened.

cutthroat trout = C2NL. Species is a Category 2 in Montana; elsewhere in its range it may not have USF&WS designation.

fisher = NLC2. Species has no USF&WS designation in Montana; elsewhere in its range it may be a Category 2.

USFS Status: The status of species in Montana as defined by the U.S. Forest Service manual (2670.22). These taxa are listed as such by the Regional Forester (Northern Region) on Montana National Forests.

One or more of the following fields may also appear on summary reports:

Township, range & section: Township, range and section of the centroid of the element occurrence.

County: County or counties containing the element occurrence.

Last observation: Date at which the element was last observed extant at this site (not necessarily the date site was last visited).

Watershed: The 8-digit code from U.S. Geological Survey Hydrologic Unit Map. If the element occurrence spans more than one watershed, the watershed which includes the centroid is listed first.

USGS quadrangle: Name of the 7.5 USGS topographic map(s) where element occurrence can be located.

Element occurrence code: Heritage Program taxonomic code assigned to each element, along with an identifier for each occurrence.

Precision: The degree of location accuracy:

- S = Second: precision of location is to within a three-second radius
- M = Minute: precision of location is to within a one-minute radius (approximately 1.5 miles)
- G = General: precision to within approximately 5 miles, or to place name only.
- U = Unmappable

Survey date: Date of the most recent field survey.

* * *

Please remember that this report is a summary of information, and additional data are available on most element occurrences.

If you have questions, feel free to contact the Montana Natural Heritage Program staff.

MONTANA NATURAL HERITAGE PROGRAM
Species of Special Concern: Sieben Training Area
(Township 12-13N and Range 3-5W, AND Township 11N and Range 3-4W)

Ref.	Name/Common Name	G Rank	S Rank	US ESA	USFS	Township-Range-Section		County
044	BIRD ROOKERY BIRD ROOKERY	Z	Z			011N003W	27	Lewis and Clark
001	OXYTROPIS LAGOPUS VAR CONJUGENS RABBIT-FOOT CRAZYWEED	G4T2	S3			011N003W	02	Lewis and Clark
056	HALIAEETUS LEUCOCEPHALUS BALD EAGLE	G3	S3B,S3N	LE	ENDANGERED	012N003W		Lewis and Clark
140	HALIAEETUS LEUCOCEPHALUS BALD EAGLE	G3	S3B,S3N	LE	ENDANGERED	013N003W		Lewis and Clark
024	LESQUERELLA KLAUSII DIVIDE BLADDERPOD	G3	S3			013N004W	12	Lewis and Clark
028	LESQUERELLA KLAUSII DIVIDE BLADDERPOD	G3	S3			013N005W	02	Lewis and Clark

6 Records listed.

MONTANA NATURAL HERITAGE PROGRAM
Species of Special Concern: Fort Harrison Training Area and Helena Area
(Township 10N and Range 1-5W, AND, Township 9N and Range 1E-3W)

Ref.	Name/Common Name	G Rank	S Rank	US ESA	USFS	Township-Range-Section		County
003	ASTRAGALUS CONVALLARIUS VAR CONVALLARIUS LESSER RUSHY MILKVETCH	G5T5	S2			009N001W	06	Broadwater
003	OXYTROPIS LAGOPUS VAR CONJUGENS RABBIT-FOOT CRAZYWEED	G4T2	S3			010N001W	15	Lewis and Clark
109	HALIAEETUS LEUCOCEPHALUS BALD EAGLE	G3	S3B,S3N	LE	ENDANGERED	010N001W		Lewis and Clark
009	OXYTROPIS LAGOPUS VAR CONJUGENS RABBIT-FOOT CRAZYWEED	G4T2	S3			010N003W	31	Lewis and Clark
005	ASTRAGALUS CONVALLARIUS VAR CONVALLARIUS LESSER RUSHY MILKVETCH	G5T5	S2			010N003W	28	Lewis and Clark
001	ASTRAGALUS CONVALLARIUS VAR CONVALLARIUS LESSER RUSHY MILKVETCH	G5T5	S2			010N003W 010N004W	31 36	Lewis and Clark
002	ASTRAGALUS CONVALLARIUS VAR CONVALLARIUS LESSER RUSHY MILKVETCH	G5T5	S2			010N004W	25	Lewis and Clark
006	SENECIO DEBILIS ROCKY MOUNTAIN RAGWORT	G3G4	S1			010N004W	13	Lewis and Clark
001	AGROPYRON SPICATUM/STIPA COMATA PA BLUEBUNCH WHEATGRASS/NEEDLE-AND-THREAD GRASS ASSOCIATION	G3?	S2?			010N004W	15	Lewis and Clark
001	AGROPYRON SPICATUM/POA CUSICKII PA BLUEBUNCH WHEATGRASS/CUSICK'S BLUEGRASS ASSOCIATION	G?	S?			010N005W	34	Lewis and Clark

10 Records listed.

MONTANA NATURAL HERITAGE PROGRAM
Species of Special Concern: Flight Path South of Helena
(Township 8N and Range 3-5W, Township 6-7N and Range 4-5W, Township 3-5N and Range 5-6W, Township 2N and Range 6-7W, Township 1N and Range 6-8W)

Ref.	Name/Common Name	G Rank	S Rank	US ESA	USFS	Township-Range	Section	County
012	ERIGERON GRACILIS SLENDER FLEABANE	G4	S2			001N007W	33	Silver Bow
012	GENTIANA AQUATICA WET MEADOW GENTIAN	G4	S2S3			001N007W	27	Silver Bow
007	CAREX IDAHOA IDAHO SEDGE	G2Q	S1	3C	SENSITIVE	001N007W	27	Silver Bow
008	THLASPI PARVIFLORUM SMALL-FLOWERED PENNYCRESS	G3	S2		SENSITIVE	001N007W	31	Silver Bow
007	CAREX VALLICOLA VALLEY SEDGE	G5	S2			001N007W	22	Silver Bow
014	ARABIS FECUNDA SAPPHIRE ROCKCRESS	G2	S2	C2	SENSITIVE	001N007W	28	Silver Bow
009	ERIGERON GRACILIS SLENDER FLEABANE	G4	S2			001N007W 001N008W	31 34	Silver Bow
015	ARABIS FECUNDA SAPPHIRE ROCKCRESS	G2	S2	C2	SENSITIVE	001N007W	27	Silver Bow
005	CLAYTONIA LANCEOLATA VAR FLAVA YELLOW SPRINGBEAUTY	G5T1?	S3	C2	SENSITIVE	001N008W	27	Silver Bow
001	HAPLOPAPPUS MACRONEMA VAR LINEARIS LINEAR-LEAVED DISCOID GOLDENWEED	G4T?	S2			001N008W 001S008W	35 03	Silver Bow
010	JUNCUS HALLII HALL'S RUSH	G4G5	S2		SENSITIVE	001N008W	36	Silver Bow
001	CAREX IDAHOA IDAHO SEDGE	G2Q	S1	3C	SENSITIVE	001N008W	35	Silver Bow
010	VIOLA RENIFOLIA KIDNEY-LEAF WHITE VIOLET	G5	S1		SENSITIVE	001N008W 001N009W	31 36	Silver Bow
002	HAPLOPAPPUS MACRONEMA VAR LINEARIS LINEAR-LEAVED DISCOID GOLDENWEED	G4T?	S2			001N008W	22	Silver Bow
017	ARABIS FECUNDA SAPPHIRE ROCKCRESS	G2	S2	C2	SENSITIVE	001N008W	31	Silver Bow
008	ERIGERON GRACILIS SLENDER FLEABANE	G4	S2			001N008W	34	Silver Bow
046	PENSTEMON LEMHIENSIS LEMHI BEARDTONGUE	G3	S2	C2	SENSITIVE	001S007W 001N007W	06 32	Silver Bow
018	ARABIS FECUNDA SAPPHIRE ROCKCRESS	G2	S2	C2	SENSITIVE	001S008W 001N008W	03 35	Silver Bow

MONTANA NATURAL HERITAGE PROGRAM
Species of Special Concern: Flight Path South of Helena
(Township 8N and Range 3-5W, Township 6-7N and Range 4-5W, Township 3-5N and Range 5-6W, Township 2N and Range 6-7W, Township 1N and Range 6-8W)

Ref.	Name/Common Name	G Rank	S Rank	US ESA	USFS	Township-Range-Section		County
008	DRABA DENSIFOLIA DENSE-LEAF WHITLOW-GRASS	G5	S2			002N006W	18	Jefferson
044	ONCORHYNCHUS CLARKI LEWISI WESTSLOPE CUTTHROAT TROUT	G4T3	S3		SENSITIVE	002N006W	01	Jefferson
001	DRABA DENSIFOLIA DENSE-LEAF WHITLOW-GRASS	G5	S2			002N006W	20	Jefferson
009	DRABA DENSIFOLIA DENSE-LEAF WHITLOW-GRASS	G5	S2			002N007W	10	Silver Bow
010	DRABA DENSIFOLIA DENSE-LEAF WHIT'OW-GRASS	G5	S2			003N006W	26	Jefferson
181	ONCORHYNCHUS CLARKI LEWISI WESTSLOPE CUTTHROAT TROUT	G4T3	S3		SENSITIVE	003N006W	13	Jefferson
003	ADOXA MOSCHATELLINA MUSK-ROOT	G5	S1		SENSITIVE	006N005W	18	Jefferson
002	ONCORHYNCHUS CLARKI BOUVIERI YELLOWSTONE CUTTHROAT TROUT	G4T3	S2		SENSITIVE	006N005W	16	Jefferson
011	OXYTROPIS LAGOPUS VAR CONJUGENS RABBIT-FOOT CRAZYWEED	G4T2	S3			007N004W	17	Jefferson
049	THYMALLUS ARCTICUS MONTANUS MONTANA ARCTIC GRAYLING	G5T2	S1	C1	SENSITIVE	008N005W	13	Jefferson

28 Records listed.

MONTANA NATURAL HERITAGE PROGRAM
Species of Special Concern: Twin Bridges Training Area and Flight Path
(Township 1S-3S and Range 7W-8W)

Ref.	Name/Common Name	G Rank	S Rank	US ESA	USFS	Township-Range-Section		County
001	HAPLOPAPPUS MACRONEMA VAR LINEARIS LINEAR-LEAVED DISCOID GOLDENWEED	G4T?	S2			001N008W 001S008W	35 03	Silver Bow
005	RANUNCULUS VERECUNDUS TIMBERLINE BUTTERCUP	G5	S1			001S007W	16	Madison
046	PENSTEMON LEMHIENSIS LEMHI BEARDTONGUE	G3	S2	C2	SENSITIVE	001S007W 001N007W	06 32	Silver Bow
014	SAXIFRAGA TEMPESTIVA STORM SAXIFRAGE	G2	S2		SENSITIVE	001S007W	16	Madison
047	PENSTEMON LEMHIENSIS LEMHI BEARDTONGUE	G3	S2	C2	SENSITIVE	001S008W	04	Silver Bow
018	ARABIS FECUNDA SAPPHIRE ROCKCRESS	G2	S2	C2	SENSITIVE	001S008W 001N008W	03 35	Silver Bow
007	THLASPI PARVIFLORUM SMALL-FLOWERED PENNYCRESS	G3	S2		SENSITIVE	001S008W	01	Silver Bow
010	ERIGERON GRACILIS SLENDER FLEABANE	G4	S2			001S008W	34	Silver Bow
006	OROBANCHE CORYMBOSA FLAT-TOPPED BROOMRAPE	G4	S2		WATCH	002S006W 002S007W	7 12	Madison
010	ASTRAGALUS PLATYTROPIS BROAD-KEELED MILKVETCH	G5	S2			002S007W	31	Madison

10 Records listed.

MONTANA NATURAL HERITAGE PROGRAM
Species of Special Concern: Limestone Hills and Lone Mountain Training Areas and Flight Paths
(Township 4N-8N and Range 1W-2E)

Ref.	Name/Common Name	G Rank	S Rank	US ESA	USFS	Township-Range-Section		County
004	CHARADRIUS MONTANUS MOUNTAIN PLOVER	G3	S2B,SZN	C2	SENSITIVE	004N001W	14	Broadwater
051	BIRD ROOKERY BIRD ROOKERY	Z	Z			005N002E	15	Broadwater
141	HALIAEETUS LEUCOCEPHALUS BALD EAGLE	G3	S3B,S3N	LE	ENDANGERED	006N002E		Broadwater
052	BIRD ROOKERY BIRD ROOKERY	Z	Z			006N002E	28	Broadwater
006	TOWNSENDIA SPATHULATA SWORD TOWNSENDIA	G3	S3	3C		007N001E 006N001E	34 03	Broadwater
005	PELECANUS ERYTHRORHYNCHOS AMERICAN WHITE PELICAN	G3	S2B,SZN			007N002E	04	Broadwater
011	BIRD ROOKERY BIRD ROOKERY	Z	Z			007N002E	19	Broadwater
002	STERNA CASPIA CASPIAN TERN	G5	S3B,SZN			007N002E	04	Broadwater
078	BIRD ROOKERY BIRD ROOKERY	Z	Z			007N002E	04	Broadwater
004	ASTRAGALUS CONVALLARIUS VAR CONVALLARIUS LESSER RUSHY MILKVETCH	G5T5	S2			008N001W 008N001E	13 18	Broadwater

10 Records listed.

MONTANA NATURAL HERITAGE PROGRAM

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(406) 444-3009

EXPLANATION OF VERTEBRATE SPECIES LISTS

The Vertebrate Species List is generated from the Vertebrate Characterization Abstract database (VCA), compiled by the Montana Natural Heritage Program. This database contains records on 620 vertebrate species found in Montana and includes detailed information on the distribution, taxonomy, phenology, and habitat of these species.

The Vertebrate Species List summarizes a portion of the distribution data maintained in the VCA. Extensive additional information is available for most of these species. The VCA database allows information to be sorted by shared characteristics such as location, habitat type, status, food habits, or activity patterns. Comment fields contain detailed information on migration, foods, reproduction and development, species ecology, activity, range, and habitat. Each record is also linked to fully-cited and abstracted reference sources.

* * *

Certain codes and abbreviations are used in this report. Although most of these are very straightforward, the following field-by-field explanation should answer most questions.

Name: Plant and animal scientific names consisting of genus and species, with subspecific or varietal names if applicable. Plant associations and community types that existed in the pre-settlement landscape of Montana are named using the scientific names of dominant overstory and understory species.

Common name: Common name of species or community, often as given in regional floras and field guides.

Global rank and State rank: Elements are evaluated and ranked by the Heritage Program on the basis of their global (range-wide) status, and their state-wide status. These ranks are used to determine protection and data collection priorities, and are revised as new information becomes available.

A scale of 1 (critically imperiled) to 5 (demonstrably secure) is used for these ranks, and each species is assigned the appropriate combination of global and state ranks.

Example: common loon = G5 / S3 (i.e., species is demonstrably secure globally; in Montana is found within a restricted range).

Global and state ranks are assigned according to a standardized procedure used by all Natural Heritage Programs, and are defined below.

Global/State Rank		Definition (G = Range-wide; S = Montana)
G1	S1	Critically imperiled because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction.
G2	S2	Imperiled because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range.
G3	S3	Either very rare and local throughout its range, or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction throughout its range because of other factors; in the range of 21 to 100 occurrences.
G4	S4	Apparently secure, though it may be quite rare in parts of its range, especially at the periphery.
G5	S5	Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery.
GU	SU	Possibly in peril, but status uncertain; more information needed.
GH	SH	Historically known; may be rediscovered.
GX	SX	Believed to be extinct; historical records only, continue search.

Other codes:

A	Accidental in the state; including species (usually birds or butterflies) recorded very infrequently, hundreds or thousands of miles outside their usual range.
B	A state rank modifier indicating breeding status for a migratory species.
E	An exotic established in the state; may be native in nearby regions.
N	A state rank modifier indicating non-breeding status for a migratory species.
Q	Taxonomic questions or problems involved, more information needed; appended to the global rank.
R	Reported in the state; but lacking documentation which would provide a basis for either accepting or rejecting the

report.

T — Rank for a subspecific taxon (subspecies or variety); appended to the global rank for the full species.

Z — Ranking not applicable.

State Status: These symbols give the state legal status of vertebrates as listed in the 1989 Statutes of Montana for the Department of Fish, Wildlife and Parks.

GA = game animal
GF = game fish
FB = fur bearing animal
MB = migratory bird
UB = upland game bird
E = endangered
NG = nongame wildlife
P = protected species
U = unprotected species

Management Status:

CD = closed season
RH = restricted harvest

USF&WS (USESA) Status: The symbols in this column denote the categories defined in the U.S. Fish and Wildlife Service Notices of Review (1980, 1983, 1985, 1990), and indicate the status of a taxon with respect to the federal Endangered Species Act of 1973:

LE — Endangered

LT — Threatened

P — Proposed E or T

C1 — Notice of Review, Category 1 (substantial biological information on file to support the appropriateness of proposing to list as endangered or threatened).

C2 — Notice of Review, Category 2 (current information indicates that proposing to list as endangered or threatened is possibly appropriate, but substantial biological information is not on file to support an immediate ruling).

C2* — Category 2, and the taxon is possibly extinct.

3A — Taxa for which the USFWS has persuasive evidence of extinction.

3B — Names that, on the basis of current taxonomic understanding, do not represent taxa meeting the Endangered Species Act's definition of "species."

3C — Taxa that have proven to be more abundant or widespread than was previously believed, and/or those that are not subject to any identifiable threat.

NL — Not listed/no designation. (See note below.)

Note: A species can have more than one federal designation if the species' status varies within its range. In these instances the Montana designation is listed first.

Examples: bald eagle = LELT. Species is Listed Endangered in Montana; elsewhere in its range it may be Listed Threatened.

cutthroat trout = C2NL. Species is a Category 2 in Montana; elsewhere in its range it may not have USF&WS designation.

fisher = NLC2. Species has no USF&WS designation in Montana; elsewhere in its range it may be a Category 2.

USFS Status: The status of species in Montana as defined by the U.S. Forest Service manual (2670.22). These taxa are listed as such by the Regional Forester (Northern Region) on Montana National Forests.

* * *

If you have questions about this report, or about any of the other databases maintained by the Montana Natural Heritage Program, or would like to request a Vertebrate Characterization Abstract for any of these species, please contact us.

MONTANA NATURAL HERITAGE PROGRAM
State Library Building
1515 East Sixth Avenue
Helena, Montana 59620
(406) 444-3009

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Name Common Name	Global Rank	State Rank	State Status	USF&WS Status	USFS Status
FISH:					
COTTUS BAIRDI MOTTLED SCULPIN	G5	S5	NG		
ONCORHYNCHUS NERKA KOKANEE	G5	SE5	GF		
ONCORHYNCHUS CLARKI BOUVIERI YELLOWSTONE CUTTHROAT TROUT	G4T3	S2	GF		SENSITIVE
ONCORHYNCHUS CLARKI LEWISI WESTSLOPE CUTTHROAT TROUT	G4T3	S3	GF		SENSITIVE
ONCORHYNCHUS MYKISS RAINBOW TROUT	G5	S5	GF		
PROSOPIUM WILLIAMSONI MOUNTAIN WHITEFISH	G5	S5	GF		
SALMO TRUTTA BROWN TROUT	G5	SE5	GF		
SALVELINUS FONTINALIS BROOK TROUT	G5	SE5	GF		
THYMALLUS ARCTICUS MONTANUS MONTANA ARCTIC GRAYLING	G5T2	S1	GFRH	C1	SENSITIVE
CARASSIUS AURATUS GOLDFISH	G5	SE4	NG		
CYPRINUS CARPIO COMMON CARP	G5	SE5	NG		
GILA ATRARIA UTAH CHUB	G4?	SE4	NG		
PIMEPHALES PROMELAS FATHEAD MINNOW	G5	S5	NG		
PTYCHOCHEILUS OREGONENSIS NORTHERN SQUAWFISH	G5	S5	NG		
RHINICHTHYS CATARACTAE LONGNOSE DACE	G5	S5	NG		
RICHARDSONIUS BALTEATUS REDSIDE SHINER	G5	S5	NG		
HYBOPSIS GRACILIS FLATHEAD CHUB	G5	S5	NG		
CATOSTOMUS CATOSTOMUS LONGNOSE SUCKER	G5	S5	NG		
CATOSTOMUS COMMERSONI WHITE SUCKER	G5	S5	NG		
CATOSTOMUS PLATYRHYNCHUS MOUNTAIN SUCKER	G5	S5	NG		
NOTURUS FLAVUS STONECAT	G5	S5	NG		
ICTALURUS MELAS BLACK BULLHEAD	G5	SE5	NG		
LOTA LOTA BURBOT	G5	S5	GF		

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LEPOMIS MACROCHIRUS BLUEGILL	G5	SE5	NG		
MICROPTERUS SALMOIDES LARGEMOUTH BASS	G5	SE5	GF		
POMOXIS NIGROMACULATUS BLACK CRAPPIE	G5	SE5	NG		
PERCA FLAVESCENS YELLOW PERCH	G5	SE5	NG		
STIZOSTEDION VITREUM WALLEYE	G5	SE5	GF		
AMPHIBIANS:					
AMBYSTOMA MACRODACTYLUM LONG-TOED SALAMANDER	G5	S5	NG		
BUFO BOREAS WESTERN TOAD	G5	S4	NG		
PSEUDACRIS TRISERIATA WESTERN CHORUS FROG	G5	S5	NG		
SCAPHIOPUS BOMBIFRONS PLAINS SPADEFOOT	G5	S4?	NG		
RANA PIPIENS NORTHERN LEOPARD FROG	G5	S4	NG		
RANA PRETIOSA SPOTTED FROG	G4	S4	NG	C2C1	
REPTILES:					
CHRYSEMYS PICTA PAINTED TURTLE	G5	S5	NG		
PHRYNOSOMA DOUGLASI SHORT-HORNED LIZARD	G5	S4	NG		
CHARINA BOTTAE RUBBER BOA	G5	S4	NG		
COLUBER CONSTRICTOR RACER	G5	S5	NG		
HETERODON NASICUS WESTERN HOGNOSE SNAKE	G5	S3?	NG		
PITUOPHIS MELANOLEUCUS PINE OR GOPHER SNAKE	G5	S5	NG		
THAMNOPHIS ELEGANS WESTERN TERRESTRIAL GARTER SNAKE	G5	S5	NG		
THAMNOPHIS SIRTALIS COMMON GARTER SNAKE	G5	S5	NG		
CROTALUS VIRIDIS WESTERN RATTLESNAKE	G5	S4	NG		
BIRDS:					
GAVIA IMMER COMMON LOON	G5	S3B,SZN	P		SENSITIVE
PODILYMBUS PODICEPS PIED-BILLED GREBE	G5	S5B,SZN	P		

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PODICEPS AURITUS HORNED GREBE	G5	S4B,SZN	P		
PODICEPS GRISEGENA RED-NECKED GREBE	G5	S4B,SZN	P		
PODICEPS NIGRICOLLIS EARED GREBE	G5	S5B,SZN	P		
AECHMOPHORUS OCCIDENTALIS WESTERN GREBE	G5	S4B,SZN	P		
PELECANUS ERYTHRORHYNCHOS AMERICAN WHITE PELICAN	G3	S2B,SZN	P		
PHALACROCORAX AURITUS DOUBLE-CRESTED CORMORANT	G5	S5B,SZN	P		
BOTAURUS LENTIGINOSUS AMERICAN BITTERN	G4	S4B,SZN	P		
ARDEA HERODIAS GREAT BLUE HERON	G5	S5B,SZN	P		
CASMERODIUS ALBUS GREAT EGRET	G5	SAN	P		
EGRETTA THULA SNOWY EGRET	G5	SAB,SZN	P		
BUBULCUS IBIS CATTLE EGRET	G5	SAN	P		
BUTORIDES STRIATUS GREEN-BACKED HERON	G5	SAN	P		
NYCTICORAX NYCTICORAX BLACK-CROWNED NIGHT-HERON	G5	S3B,SZN	P		
PLEGADIS CHIHI WHITE-FACED IBIS	G5	S2B,SZN	P	C2	
CYGNUS COLUMBIANUS TUNDRA SWAN	G5	SZN	MB		
CYGNUS BUCCINATOR TRUMPETER SWAN	G4	S1N,S2B	MB	C2NL	SENSITIVE
CYGNUS OLOR MUTE SWAN	G5	SE	?		
ANSER ALBIFRONS GREATER WHITE-FRONTED GOOSE	G5	SZN	MB		
CHEN CAERULESCENS SNOW GOOSE	G5	S4N	MB		
CHEN ROSSII ROSS' GOOSE	G4	S4N	MB		
BRANTA CANADENSIS CANADA GOOSE	G5	S5B,SZN	MB		
AIX SPONSA WOOD DUCK	G5	S5B,SZN	MB		
ANAS CRECCA GREEN-WINGED TEAL	G5	S5B,SZN	MB		

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ANAS RUBRIPES AMERICAN BLACK DUCK	G4	SAN	MB		
ANAS PLATYRHYNCHOS MALLARD	G5	S5B,S5N	MB		
ANAS ACUTA NORTHERN PINTAIL	G5	S5B,SZN	MB		
ANAS DISCORS BLUE-WINGED TEAL	G5	S5B,SZN	MB		
ANAS CYANOPTERA CINNAMON TEAL	G5	S5B,SZN	MB		
ANAS CLYPEATA NORTHERN SHOVELER	G5	S5B,SZN	MB		
ANAS STREPERA GADWALL	G5	S5B,SZN	MB		
ANAS AMERICANA AMERICAN WIGEON	G5	S5B,SZN	MB		
AYTHYA VALISINERIA CANVASBACK	G5	S5B,SZN	MB		
AYTHYA AMERICANA REDHEAD	G5	S5B,SZN	MB		
AYTHYA COLLARIS RING-NECKED DUCK	G5	S5B,SZN	MB		
AYTHYA MARILA GREATER SCAUP	G5	SAN	MB		
AYTHYA AFFINIS LESSER SCAUP	G5	S5B,SZN	MB		
HISTRIONICUS HISTRIONICUS HARLEQUIN DUCK	G5	S2B,SZN	MB	C2	SENSITIVE
CLANGULA HYEMALIS OLDSQUAW	G5	SAN	MB		
MELANITTA PERSPICILLATA SURF SCOTER	G5	SAN	MB		
MELANITTA FUSCA WHITE-WINGED SCOTER	G5	SAN	MB		
BUCEPHALA CLANGULA COMMON GOLDENEYE	G5	S5B,S5N	MB		
BUCEPHALA ISLANDICA BARROW'S GOLDENEYE	G5	S5B,SZN	MB		
BUCEPHALA ALBEOLA BUFFLEHEAD	G5	S5B,SZN	MB		
LOPHODYTES CUCULLATUS HOODED MERGANSER	G5	S4B,SZN	MB		
MERGUS MERGANSER COMMON MERGANSER	G5	S5B,SZN	MB		
MERGUS SERRATOR RED-BREASTED MERGANSER	G5	SZN	MB		
OXYURA JAMAICENSIS RUDDY DUCK	G5	S5B,SZN	MB		

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CATHARTES AURA TURKEY VULTURE	G5	S4B,SZN	P		
PANDION HALIAETUS OSPREY	G5	S5B,SZN	P		
HALIAEETUS LEUCOCEPHALUS BALD EAGLE	G3	S3B,S3N	P	LELT	ENDANGERED
CIRCUS CYANEUS NORTHERN HARRIER	G5	S4B,SZN	P		
ACCIPITER STRIATUS SHARP-SHINNED HAWK	G5	S4B,SZN	P		
ACCIPITER COOPERII COOPER'S HAWK	G4	S4B,SZN	P		
ACCIPITER GENTILIS NORTHERN GOSHAWK	G4	S4	P	C2	
BUTEO SWAINSONI SWAINSON'S HAWK	G4	S5B,SZN	P		
BUTEO JAMAICENSIS RED-TAILED HAWK	G5	S5B,SZN	P		
BUTEO REGALIS FERRUGINOUS HAWK	G4	S3B,SZN	P	C2	SENSITIVE
BUTEO LAGOPUS ROUGH-LEGGED HAWK	G5	S5N	P		
AQUILA CHRYSAETOS GOLDEN EAGLE	G4	S4	P		
FALCO SPARVERIUS AMERICAN KESTREL	G5	S5B,SZN	P		
FALCO COLUMBARIUS MERLIN	G4	S4	P		
FALCO PEREGRINUS PEREGRINE FALCON	G3	S1S2B,SZN	E	E/SA	ENDANGERED
FALCO RUSTICOLUS GYRFALCON	G5	SZN	P		
FALCO MEXICANUS PRAIRIE FALCON	G5	S4	P		
PERDIX PERDIX GRAY PARTRIDGE	G5	SE4	UB		
ALECTORIS CHUKAR CHUKAR	G5	SE4	UB		
PHASIANUS COLCHICUS RING-NECKED PHEASANT	G5	SE5	UB		
DENDRAGAPUS CANADENSIS SPRUCE GROUSE	G5	S4	UB		
DENDRAGAPUS OBSCURUS BLUE GROUSE	G5	S5	UB		
LAGOPUS LEUCURUS WHITE-TAILED PTARMIGAN	G5	S3	UBCS		

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BONASA UMBELLUS RUFFED GROUSE	G5	S5	UB		
CENTROCERCUS UROPHASIANUS SAGE GROUSE	G5	S5	UB		
TYMPANUCHUS PHASIANELLUS SHARP-TAILED GROUSE	G4	S5	UB		SENSITIVE
MELEAGRIS GALLOPAVO WILD TURKEY	G5	SE5	UB		
RALLUS LIMICOLA VIRGINIA RAIL	G5	S5B,SZN	MBCS		
PORZANA CAROLINA SORA	G5	S5B,SZN	MBCS		
FULICA AMERICANA AMERICAN COOT	G5	S5B,SZN	MB		
GRUS CANADENSIS SANDHILL CRANE	G5	S2N,S5B	MB		
GRUS AMERICANA WHOOPING CRANE	G1	SHN	E	LE	ENDANGERED
PLUVIALIS SQUATAROLA BLACK-BELLIED PLOVER	G5	SZN	P		
PLUVIALIS DOMINICA LESSER GOLDEN-PLOVER	G5	SZN	P		
CHARADRIUS ALEXANDRINUS SNOWY PLOVER	G4?	SAB,SAN	P	C2C1	
CHARADRIUS SEMIPALMATUS SEMIPALMATED PLOVER	G5	SZN	P		
CHARADRIUS MELODUS PIPING PLOVER	G3	S2B,SZN	P	LTLE	THREATENED
CHARADRIUS VOCIFERUS KILLDEER	G5	S5B,SZN	P		
CHARADRIUS MONTANUS MOUNTAIN PLOVER	G3	S2B,SZN	P	C2	SENSITIVE
HIMANTOPUS MEXICANUS BLACK-NECKED STILT	G5	S3B,SZN	P		
RECURVIROSTRA AMERICANA AMERICAN AVOCET	G5	S5B,SZN	P		
TRINGA MELANOLEUCA GREATER YELLOWLEGS	G5	SZN	P		
TRINGA FLAVIPES LESSER YELLOWLEGS	G5	SZN	P		
TRINGA SOLITARIA SOLITARY SANDPIPER	G5	SZN	P		
CATOPTROPHORUS SEMIPALMATUS WILLET	G5	S5B,SZN	P		
ACTITIS MACULARIA SPOTTED SANDPIPER	G5	S5B,SZN	P		
BARTRAMIA LONGICAUDA UPLAND SANDPIPER	G5	S4B,SZN	P		

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Name Common Name	Global Rank	State Rank	State Status	USF&WS Status	USFS Status
NUMENIUS PHAEOPUS WHIMBREL	G5	SZN	P		
NUMENIUS AMERICANUS LONG-BILLED CURLEW	G5	S4B,SZN	P	3C	
LIMOSA FEDOA MARBLED GODWIT	G5	S4B,SZN	P		
ARENARIA INTERPRES RUDDY TURNSTONE	G5	SZN	P		
CALIDRIS ALBA SANDERLING	G5	SZN	P		
CALIDRIS PUSILLA SEMIPALMATED SANDPIPER	G5	SZN	P		
CALIDRIS MAURI WESTERN SANDPIPER	G5	SZN	P		
CALIDRIS MINUTILLA LEAST SANDPIPER	G5	SZN	P		
CALIDRIS BAIRDII BAIRD'S SANDPIPER	G4	SZN	P		
CALIDRIS MELANOTOS PECTORAL SANDPIPER	G5	SZN	P		
CALIDRIS ALPINA DUNLIN	G5	SZN	P		
CALIDRIS HIMANTOPUS STILT SANDPIPER	G5	SZN	P		
TRYNGITES SUBRUFICOLLIS BUFF-BREASTED SANDPIPER	G4	SAN	P		
LIMNODROMUS SCOLOPACEUS LONG-BILLED DOWITCHER	G5	SZN	P		
GALLINAGO GALLINAGO COMMON SNIPE	G5	S5B,SZN	MB		
PHALAROPUS TRICOLOR WILSON'S PHALAROPE	G5	S5B,SZN	P		
PHALAROPUS LOBATUS RED-NECKED PHALAROPE	G5	SZN	P		
STERCORARIUS POMARINUS POMARINE JAEGER	G5	SAN	P		
STERCORARIUS PARASITICUS PARASITIC JAEGER	G5	SAN	P		
LARUS PIPIXCAN FRANKLIN'S GULL	G5	S4B,SZN	P		
LARUS PHILADELPHIA BONAPARTE'S GULL	G5	SZN	P		
LARUS DELAWARENSIS RING-BILLED GULL	G5	S5B,SZN	P		
LARUS CALIFORNICUS CALIFORNIA GULL	G5	S5B,SZN	P		

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LARUS ARGENTATUS HERRING GULL	G5	SAB,SZN	P		
LARUS GLAUCOIDES ICELAND GULL	G5	SAN	P		
STERNA CASPIA CASPIAN TERN	G5	S3B,SZN	P		
STERNA HIRUNDO COMMON TERN	G5	S3B,SZN	P	NLC2	
STERNA FORSTERI FORSTER'S TERN	G5	S3B,SZN	P		
CHLIDONIAS NIGER BLACK TERN	G4	S3B,SZN	P	C2	
SYNTHLIBORAMPHUS ANTIQUUS ANCIENT MURRELET	G5?	SAN	P		
COLUMBA LIVIA ROCK DOVE	G5	SE5	U		
COLUMBA FASCIATA BAND-TAILED PIGEON	G5	SAN	P		
ZENAIDA MACROURA MOURNING DOVE	G5	S5B,SZN	MB		
COCCYZUS ERYTHROPTHALMUS BLACK-BILLED CUCKOO	G5	S4B,SZN	P		
COCCYZUS AMERICANUS YELLOW-BILLED CUCKOO	G5	S3B,SZN	P		
OTUS FLAMMEOLUS FLAMMULATED OWL	G4	S1S3B,SZN	P		SENSITIVE
BUBO VIRGINIANUS GREAT HORNED OWL	G5	S5	P		
NYCTEA SCANDIACA SNOWY OWL	G5	SZN	P		
GLAUCIDIUM GNOMA NORTHERN PYGMY-OWL	G5	S4	P		
SPEOTYTO CUNICULARIA BURROWING OWL	G4	S3B,SZN	P		
STRIX VARIA BARRED OWL	G5	S4	P		
STRIX NEBULOSA GREAT GRAY OWL	G5	S3	P		
ASIO OTUS LONG-EARED OWL	G5	S5	P		
ASIO FLAMMEUS SHORT-EARED OWL	G5	S4	P		
AEGOLIUS FUNEREUS BOREAL OWL	G5	S3	P		SENSITIVE
AEGOLIUS ACADICUS NORTHERN SAW-WHET OWL	G5	S4	P		
CHORDEILES MINOR COMMON NIGHTHAWK	G5	S5B,SZN	P		

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PHALAENOPTILUS NUTTALLII COMMON POORWILL	G5	S4B,SZN	P		
CYPSELOIDES NIGER BLACK SWIFT	G4	S3B,SZN	P		
CHAETURA PELAGICA CHIMNEY SWIFT	G5	S4B,SUN	P		
CHAETURA VAUXI VAUX'S SWIFT	G5	S4B,SZN	P		
AERONAUTES SAXATALIS WHITE-THROATED SWIFT	G5	S5B,SZN	P		
ARCHILOCHUS ALEXANDRI BLACK-CHINNED HUMMINGBIRD	G5	S4B,SZN	P		
STELLULA CALLIOPE CALLIOPE HUMMINGBIRD	G5	S5B,SZN	P		
SELASPHORUS RUFUS RUFOUS HUMMINGBIRD	G5	S5B,SZN	P		
CERYLE ALCYON BELTED KINGFISHER	G5	S5B,SZN	P		
MELANERPES LEWIS LEWIS' WOODPECKER	G4	S4B,SZN	P		
MELANERPES ERYTHROCEPHALUS RED-HEADED WOODPECKER	G5	S5B,SZN	P		
SPHYRAPICUS VARIUS YELLOW-BELLIED SAPSUCKER	G5	SAN	P		
SPHYRAPICUS THYROIDEUS WILLIAMSON'S SAPSUCKER	G5	S4B,SZN	P		
PICOIDES PUBESCENS DOWNY WOODPECKER	G5	S5	P		
PICOIDES VILLOSUS HAIRY WOODPECKER	G5	S5	P		
PICOIDES TRIDACTYLUS THREE-TOED WOODPECKER	G5	S5	P		
PICOIDES ARCTICUS BLACK-BACKED WOODPECKER	G5	S3	P		SENSITIVE
COLAPTES AURATUS NORTHERN FLICKER	G5	S5	P		
DRYOCOPUS PILEATUS PILEATED WOODPECKER	G5	S4	P		
CONTOPUS BOREALIS OLIVE-SIDED FLYCATCHER	G5	S5B,SZN	P		
CONTOPUS SORDIDULUS WESTERN WOOD-PEWEE	G5	S5B,SZN	P		
EMPIDONAX TRAILLII WILLOW FLYCATCHER	G5	S5B,SZN	P		
EMPIDONAX MINIMUS LEAST FLYCATCHER	G5	S5B,SZN	P		

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EMPIDONAX HAMMONDII HAMMOND'S FLYCATCHER	G5	S4B,SZN	P		
EMPIDONAX OBERHOLSERI DI'SKY FLYCATCHER	G5	S5B,SZN	P		
SAYORNIS SAYA SAY'S PHOEBE	G5	S5B,SZN	P		
MYIARCHUS CINERASCENS ASH-THROATED FLYCATCHER	G5	SAN	P		
TYRANNUS VERTICALIS WESTERN KINGBIRD	G5	S5B,SZN	P		
TYRANNUS TYRANNUS EASTERN KINGBIRD	G5	S5B,SZN	P		
EREMOPHILA ALPESTRIS HORNED LARK	G5	S5B,S5N	P		
TACHYCINETA BICOLOR TREE SWALLOW	G5	S5B,SZN	P		
TACHYCINETA THALASSINA VIOLET-GREEN SWALLOW	G5	S5B,SZN	P		
STELGIDOPTERYX SERRIPENNIS NORTHERN ROUGH-WINGED SWALLOW	G5	S5B,SZN	P		
RIPARIA RIPARIA BANK SWALLOW	G5	S5B,SZN	P		
HIRUNDO PYRRHONOTA CLIFF SWALLOW	G5	S5B,SZN	P		
HIRUNDO RUSTICA BARN SWALLOW	G5	S5B,SZN	P		
PERISOREUS CANADENSIS GRAY JAY	G5	S5	P		
CYANOCITTA STELLERI STELLER'S JAY	G5	S5	P		
CYANOCITTA CRISTATA BLUE JAY	G5	SAB,SZN	P		
GYMNORHINUS CYANOCEPHALUS PINYON JAY	G5	S4	P		
NUCIFRAGA COLUMBIANA CLARK'S NUTCRACKER	G5	S5	P		
PICA PICA BLACK-BILLED MAGPIE	G5	S5	U		
CORVUS BRACHYRHYNCHOS AMERICAN CROW	G5	S5B,SZN	U		
CORVUS CORAX COMMON RAVEN	G5	S5	P		
PARUS ATRICAPILLUS BLACK-CAPPED CHICKADEE	G5	S5	P		
PARUS GAMBELI MOUNTAIN CHICKADEE	G5	S5	P		
PARUS HUDSONICUS BOREAL CHICKADEE	G5	S3	P		

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PARUS RUFESCENS CHESTNUT-BACKED CHICKADEE	G5	S4	P		
SITTA CANADENSIS RED-BREASTED NUTHATCH	G5	S5	P		
SITTA CAROLINENSIS WHITE-BREASTED NUTHATCH	G5	S4	P		
SITTA PYGMAEA PYGMY NUTHATCH	G5	S4	P		
CERTHIA AMERICANA BROWN CREEPER	G5	S5	P		
SALPINCTES OBSOLETUS ROCK WREN	G5	S5B,SZN	P		
CATHERPES MEXICANUS CANYON WREN	G5	S4	P		
TROGLODYTES AEDON HOUSE WREN	G5	S5B,SZN	P		
TROGLODYTES TROGLODYTES WINTER WREN	G5	S5	P		
CISTOTHORUS PALUSTRIS MARSH WREN	G5	S5B,SZN	P		
CINCLUS MEXICANUS AMERICAN DIPPER	G5	S5	P		
REGULUS SATRAPA GOLDEN-CROWNED KINGLET	G5	S5	P		
REGULUS CALENDULA RUBY-CROWNED KINGLET	G5	S5B,SZN	P		
SIALIA MEXICANA WESTERN BLUEBIRD	G5	S4B,SZN	P		
SIALIA CURRUCOIDES MOUNTAIN BLUEBIRD	G5	S5B,SZN	P		
MYADESTES TOWNSENDI TOWNSEND'S SOLITAIRE	G5	S5	P		
CATHARUS FUSCESCENS VEERY	G5	S5B,SZN	P		
CATHARUS USTULATUS SWAINSON'S THRUSH	G5	S5B,SZN	P		
CATHARUS GUTTATUS HERMIT THRUSH	G5	S5B,SZN	P		
TURDUS MIGRATORIUS AMERICAN ROBIN	G5	S5B,SZN	P		
IXOREUS NAEVIUS VARIED THRUSH	G5	S5B,SZN	P		
DUMETELLA CAROLINENSIS GRAY CATBIRD	G5	S5B,SZN	P		
MIMUS POLYGLOTTOS NORTHERN MOCKINGBIRD	G5	SAB,SZN	P		

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OREOSCOPTES MONTANUS SAGE THRASHER	G5	S5B,SZN	P		
TOXOSTOMA RUFUM BROWN THRASHER	G5	S5B,SZN	P		
ANTHUS RUBESCENS AMERICAN PIPIT	G5	S5B,SZN	P		
ANTHUS SPRAGUEII SPRAGUE'S PIPIT	G4	S4B,SZN	P		
BOMBYCILLA GARRULUS BOHEMIAN WAXWING	G5	SHB,S5N	P		
BOMBYCILLA CEDRORUM CEDAR WAXWING	G5	S5B,SZN	P		
LANIUS EXCUBITOR NORTHERN SHRIKE	G5	S5N	P		
LANIUS LUDOVICIANUS LOGGERHEAD SHRIKE	G4	S4B,SZN	P	C2	
STURNUS VULGARIS EUROPEAN STARLING	G5	SE5	U		
VIREO SOLITARIUS SOLITARY VIREO	G5	S5B,SZN	P		
VIREO GILVUS WARBLING VIREO	G5	S5B,SZN	P		
VIREO OLIVACEUS RED-EYED VIREO	G5	S5B,SZN	P		
VERMIVORA PEREGRINA TENNESSEE WARBLER	G5	S3S4B,SZN	P		
VERMIVORA CELATA ORANGE-CROWNED WARBLER	G5	S5B,SZN	P		
VERMIVORA RUFICAPILLA NASHVILLE WARBLER	G5	S5B,SZN	P		
DENDROICA PETECHIA YELLOW WARBLER	G5	S5B,SZN	P		
DENDROICA MAGNOLIA MAGNOLIA WARBLER	G5	SAN	P		
DENDROICA CORONATA YELLOW-RUMPED WARBLER	G5	S5B,SZN	P		
DENDROICA NIGRESCENS BLACK-THROATED GRAY WARBLER	G5	SAN	P		
DENDROICA TOWNSENDI TOWNSEND'S WARBLER	G5	S5B,SZN	P		
DENDROICA STRIATA BLACKPOLL WARBLER	G5	SZN	P		
MNIOTILTA VARIA BLACK-AND-WHITE WARBLER	G5	S1S3B,SZN	P		
SETOPHAGA RUTICILLA AMERICAN REDSTART	G5	S5B,SZN	P		
SEIURUS AUROCAPILLUS OVENBIRD	G5	S5B,SZN	P		

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SEIURUS NOVEBORACENSIS NORTHERN WATERTHRUSH	G5	S5B,SZN	P		
OPORORN'S TOLMIEI MACGILLIVRAY'S WARBLER	G5	S5B,SZN	P		
GEOTHLYPIS TRICHAS COMMON YELLOWTHROAT	G5	S5B,SZN	P		
WILSONIA PUSILLA WILSON'S WARBLER	G5	S5B,SZN	P		
ICTERIA VIRENS YELLOW-BREASTED CHAT	G5	S5B,SZN	P		
PIRANGA OLIVACEA SCARLET TANAGER	G5	SAN	P		
PIRANGA LUDOVICIANA WESTERN TANAGER	G5	S5B,SZN	P		
PHEUCTICUS LUDOVICIANUS ROSE-BREASTED GROSBEAK	G5	SAB,SZN	P		
PHEUCTICUS MELANOCEPHALUS BLACK-HEADED GROSBEAK	G5	S5B,SZN	P		
PASSERINA AMOENA LAZULI BUNTING	G5	S5B,SZN	P		
PASSERINA CYANEA INDIGO BUNTING	G5	S2S4B,SZN	P		
PIPILO CHLORURUS GREEN-TAILED TOWHEE	G5	S4B,SZN	P		
PIPILO ERYTHROPHTHALMUS RUFOUS-SIDED TOWHEE	G5	S5B,SZN	P		
SPIZELLA ARBOREA AMERICAN TREE SPARROW	G5	SZN	P		
SPIZELLA PASSERINA CHIPPING SPARROW	G5	S5B,SZN	P		
SPIZELLA PALLIDA CLAY-COLORED SPARROW	G5	S4B,SZN	P		
SPIZELLA BREWERI BREWER'S SPARROW	G5	S4B,SZN	P		
POOECETES GRAMINEUS VESPER SPARROW	G5	S5B,SZN	P		
CHONDESTES GRAMMACUS LARK SPARROW	G5	S5B,SZN	P		
CALAMOSPIZA MELANOCORYS LARK BUNTING	G5	S5B,SZN	P		
PASSERCULUS SANDWICHENSIS SAVANNAH SPARROW	G5	S5B,SZN	P		
AMMODRAMUS BAIRDII BAIRD'S SPARROW	G3	S3S4B,SZN	P	C2	
AMMODRAMUS SAVANNARUM GRASSHOPPER SPARROW	G4	S4B,SZN	P		

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PASSERELLA ILIACA FOX SPARROW	G5	S5B,SZN	P		
MELOSPIZA MELODIA SONG SPARROW	G5	S5B,SZN	P		
MELOSPIZA LINCOLNII LINCOLN'S SPARROW	G5	S5B,SZN	P		
ZONOTRICHIA ALBICOLLIS WHITE-THROATED SPARROW	G5	SZN	P		
ZONOTRICHIA LEUCOPHRYS WHITE-CROWNED SPARROW	G5	S5B,SZN	P		
ZONOTRICHIA QUERULA HARRIS' SPARROW	G5	SZN	P		
JUNCO HYEMALIS DARK-EYED JUNCO	G5	S5B,SZN	P		
CALCARIUS MCCOWNII MCCOWN'S LONGSPUR	G4?	S5B,SZN	P		
CALCARIUS LAPPONICUS LAPLAND LONGSPUR	G5	SZN	P		
CALCARIUS ORNATUS CHESTNUT-COLLARED LONGSPUR	G5	S5B,SZN	P		
PLECTROPHENAX NIVALIS SNOW BUNTING	G5	S5N	P		
DOLICHONYX ORYZIVORUS BOBOLINK	G5	S4B,SZN	P		
AGELAIUS PHOENICEUS RED-WINGED BLACKBIRD	G5	S5B,SZN	U		
STURNELLA NEGLECTA WESTERN MEADOWLARK	G5	S5B,SZN	P		
XANTHOCEPHALUS XANTHOCEPHALUS YELLOW-HEADED BLACKBIRD	G5	S5B,SZN	U		
EUPHAGUS CAROLINUS RUSTY BLACKBIRD	G5	SZN	U		
EUPHAGUS CYANOCEPHALUS BREWER'S BLACKBIRD	G5	S5B,SZN	U		
QUISCALUS QUISCULA COMMON GRACKLE	G5	S5B,SZN	P		
MOLOTHRUS ATER BROWN-HEADED COWBIRD	G5	S5B,SZN	P		
ICTERUS GALBULA NORTHERN ORIOLE	G5	S5B,SZN	P		
LEUCOSTICTE ARCTOA ROSY FINCH	G5	S5B,S5N	P		
PINICOLA ENUCLEATOR PINE GROSBEAK	G5	S5	P		
CARPODACUS PURPUREUS PURPLE FINCH	G5	SAN	P		
CARPODACUS CASSINII CASSIN'S FINCH	G5	S5	P		

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CARPODACUS MEXICANUS HOUSE FINCH	G5	S5	P		
LOXIA CURVIROSTRA RED CROSSBILL	G5	S5	P		
LOXIA LEUCOPTERA WHITE-WINGED CROSSBILL	G5	S4	P		
CARDUELIS FLAMMEA COMMON REDPOLL	G5	S5N	P		
CARDUELIS HORNEMANNI HOARY REDPOLL	G5?	SZN	P		
CARDUELIS PINUS PINE SISKIN	G5	S5	P		
CARDUELIS TRISTIS AMERICAN GOLDFINCH	G5	S5B,SZN	P		
COCCOTHRAUSTES VESPERTINUS EVENING GROSBEAK	G5	S5	P		
PASSER DOMESTICUS HOUSE SPARROW	G5	SE5	P		
MAMMALS:					
SOREX CINEREUS MASKED SHREW	G5	S5	NG		
SOREX MONTICOLUS DUSKY OR MONTANE SHREW	G5	S5	NG		
SOREX PALUSTRIS WATER SHREW	G5	S5	NG		
MYOTIS LUCIFUGUS LITTLE BROWN MYOTIS	G5	S5	NG		
MYOTIS EVOTIS LONG-EARED MYOTIS	G5	S4	NG		
MYOTIS THYSANODES FRINGED MYOTIS	G5	S3	NG		
MYOTIS VOLANS LONG-LEGGED MYOTIS	G5	S4	NG		
MYOTIS CILIOLABRUM WESTERN SMALL-FOOTED MYOTIS	G5	S4	NG		
EPTESICUS FUSCUS BIG BROWN BAT	G5	S4	NG		
LASIURUS CINEREUS HOARY BAT	G5	S4	NG		
PLECOTUS TOWNSENDII TOWNSEND'S BIG-EARED BAT	G4	S2	NG		SENSITIVE
OCHOTONA PRINCEPS PIKA	G5	S5	NG		
SYLVILAGUS NUTTALLII NUTTALL'S OR MOUNTAIN COTTONTAIL	G5	S4	NG		
LEPUS AMERICANUS SNOWSHOE HARE	G5	S5	NG		

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LEPUS TOWNSENDII WHITE-TAILED JACK RABBIT	G4	S4	NG		
TAMIAS MINIMUS LEAST CHIPMUNK	G5	S5	NG		
TAMIAS AMOENUS YELLOW-PINE CHIPMUNK	G5	S5	NG		
TAMIAS RUFICAUDUS RED-TAILED CHIPMUNK	G5	S5	NG		
MARMOTA FLAVIVENTRIS YELLOW-BELLIED MARMOT	G5	S5	NG		
MARMOTA CALIGATA HOARY MARMOT	G5	S4	NG		
SPERMOPHILUS RICHARDSONII RICHARDSON'S GROUND SQUIRREL	G5	S5	NG		
SPERMOPHILUS COLUMBIANUS COLUMBIAN GROUND SQUIRREL	G5	S5	NG		
SPERMOPHILUS TRIDECEMLINEATUS THIRTEEN-LINED GROUND SQUIRREL	G5	S5	NG		
SPERMOPHILUS LATERALIS GOLDEN-MANTLED GROUND SQUIRREL	G5	S5	NG		
CYNOMYS LUDOVICIANUS BLACK-TAILED PRAIRIE DOG	G5	S4	NG		
TAMIASCIURUS HUDSONICUS RED SQUIRREL	G5	S5	NG		
GLAUCOMYS SABRINUS NORTHERN FLYING SQUIRREL	G5	S4	NG		
THOMOMYS TALPOIDES NORTHERN POCKET GOPHER	G5	S5	NG		
CASTOR CANADENSIS BEAVER	G5	S5	FB		
PEROMYSCUS MANICULATUS DEER MOUSE	G5	S5	NG		
ONYCHOMYS LEUCOGASTER NORTHERN GRASSHOPPER MOUSE	G5	S5	NG		
NEOTOMA CINEREA BUSHY-TAILED WOODRAT	G5	S5	NG		
CLETHRIONOMYS GAPPERI SOUTHERN RED-BACKED VOLE	G5	S5	NG		
PHENACOMYS INTERMEDIUS HEATHER VOLE	G5	S4	NG		
MICROTUS PENNSYLVANICUS MEADOW VOLE	G5	S5	NG		
MICROTUS MONTANUS MONTANE VOLE	G5	S5	NG		
MICROTUS LONGICAUDUS LONG-TAILED VOLE	G5	S5	NG		

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MICROTUS RICHARDSONI WATER VOLE	G5	S4	NG		
LAGURUS CURTATUS SAGEBRUSH VOLE	G5	S4	NG		
ONDATRA ZIBETHICUS MUSKRAT	G5	S5	FB		
SYNAPTOMYS BOREALIS NORTHERN BOG LEMMING	G5	S2	NG		SENSITIVE
RATTUS NORVEGICUS NORWAY RAT	G5	SE	NG		
MUS MUSCULUS HOUSE MOUSE	G5	SE5	NG		
ZAPUS PRINCEPS WESTERN JUMPING MOUSE	G5	S5	NG		
ERETHIZON DORSATUM PORCUPINE	G5	S5	NG		
CANIS LATRANS COYOTE	G5	S5	U		
CANIS LUPUS GRAY WOLF	G4	S1	E	LELT	ENDANGERED
VULPES VULPES RED FOX	G5	S5	NG		
URSUS AMERICANUS BLACK BEAR	G5	S5	GA		
URSUS ARCTOS GRIZZLY OR BROWN BEAR	G4	S3?	GARH	LTLE	
PROCYON LOTOR RACCOON	G5	S5	NG		
MARTES AMERICANA MARTEN	G5	S4	FB		
MUSTELA ERMINEA ERMINE	G5	S5	FB		
MUSTELA NIVALIS LEAST WEASEL	G5	S4	U		
MUSTELA FRENATA LONG-TAILED WEASEL	G5	S5	U		
MUSTELA VISON MINK	G5	S5	FB		
GULO GULO WOLVERINE	G4	S4?	FBRH	C2NL	SENSITIVE
TAXIDEA TAXUS BADGER	G5	S4	NG		
MEPHITIS MEPHITIS STRIPED SKUNK	G5	S5	U		
LUTRA CANADENSIS RIVER OTTER	G5	S4	FB		
FELIS CONCOLOR MOUNTAIN LION	G4	S4	GA		

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FELIS LYNX LYNX	G5	S3	FBRH	C2NL	SENSITIVE
FELIS RUFUS BOBCAT	G5	S5	FB		
CERVUS ELAPHUS WAPITI OR ELK	G5	S5	GA		
ODOCOILEUS HEMIONUS MULE DEER	G5	S5	GA		
ODOCOILEUS VIRGINIANUS WHITE-TAILED DEER	G5	S5	GA		
ALCES ALCES MOOSE	G5	S5	GA		
ANTILOCAPRA AMERICANA PRONGHORN	G5	S5	GA		
OREAMNOS AMERICANUS MOUNTAIN GOAT	G5	S5	GA		
OVIS CANADENSIS MOUNTAIN SHEEP	G4	S4	GA		

406 Records listed.